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B.7.1 Metabolism, distribution and expression of residues in plants

B.7.1.5 TRR study in sunflower

Report:	KIIA 6.2.1 /09;Nguyen, T; M-296493-01-1
Title:	Determination of the Total Radioactive Residue of [Pyrazole-3- ¹⁴ C] BYF 14182 in Sunflower following Seed Treatment
Report No & Document No	MEELP043 M-296493-01-1 MRID No. 48023642 PMRA No. 1886071
Guidelines:	US EPA Residue Chemistry Test Guideline OCSPP 860.1300 Nature of the Residue – Plants, Livestock PMRA Residue Chemistry Guidelines DIR98-02: Section 2 Nature of the Residue – Plants, Livestock
GLP:	Yes; Signed and dated GLP statement provided.
Acceptability:	Study is scientifically acceptable

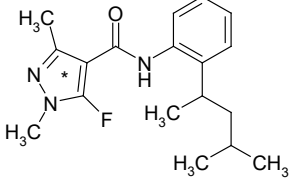
Executive Summary

Sunflower seed, treated with [pyrazole-3-¹⁴C]BYF 14182 at a rate of 18.56 g ai/100 kg seed, was planted, grown to maturity and the seed from mature sunflowers was harvested. The sunflower seed was homogenized and radioassayed. The lower limit of method validation (LLMV) was 0.05 ppm. The method limit of detection (LOD) was 0.0016 ppm in sunflower seed. The total radioactive residue (TRR) in mature sunflower seed was <0.0016 ppm, the method LOD, in all samples.

I. Material and Methods

A. Materials

Test Material

Chemical structure		* position of the radiolabel
Common Name	Penflufen	
Radiolabelled test material	[Pyrazole-3- ¹⁴ C]BYF 14182	
IUPAC name	N-[2-(1,3-Dimethylbutyl)phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide	
CAS name	5-Fluoro-1,3-dimethyl-1H-pyrazole-4-carboxylic acid [2-(1,3-dimethyl-butyl)-phenyl]-amide	
CAS #	494793-67-8	
Molar Mass	317.4 g·mol ⁻¹	
Specific radioactivity	39.01 mCi/mmol. (4.55 MBq/mg)	
Chemical Purity	> 99%	
Radiochemical purity	> 99%	

Soil

Greenhouse mixture, Loam

Plant

Sunflower

B. Study Design

Experimental conditions

Test Facility

This study was conducted by Bayer CropScience at the Bayer Research Park in Stilwell, Kansas, USA in 2007.

Application/Seed Treatment

A [pyrazole-3-¹⁴C]BYF 14182 treating solution was prepared and applied to sunflower seed at a rate of 18.56 g active ingredient (ai)/100 kg seed. Aliquots of the treatment solution were slowly discharged onto a 10 gram sample of sunflower seed inside a flat bottom flask. The contents inside the flask were mixed using the Brinkman Büchi RE111 Rotavapor rotary evaporator. The sample was rotary evaporated to dryness after being thoroughly mixed using the rotary evaporator. The procedure was repeated until all of the treatment solution was exhausted. The vial that contained the treating solution was rinsed with 1.0 mL of ACN. The rinse was added to the sunflower seed, approximately 100 µL at a time using the same technique as the treating solution. The contents inside the flask were mixed using the rotary

evaporator. The sample was rotary evaporated to dryness after being thoroughly mixed using a Büchi rotary evaporator.

Seed Treatment Rate Verification

A 1.04 g aliquot of the batch of treated sunflower seeds was placed into a 50-mL plastic centrifuge tube, and approximately 25 mL of ACN was added to the sample. The lid was secured onto the centrifuge tube, and the sample was mixed vigorously, vortexed and sonicated. The supernatant was decanted from the seed into a 100-mL, graduated mixing cylinder. This process was repeated 3 additional times, the ACN extracts were mixed and radioassayed. The solvent-extracted seed was allowed to air-dry at room temperature, and the seed was homogenized using a mortar and pestle. Aliquots of the homogenized seed were radioassayed.

Planting of the Sunflower Seed

A total of ten, 5-gal plastic buckets with drainage holes in the bottom were filled with 12 inches of untreated greenhouse soil on top of a four inch bed of gravel. Six buckets, labeled with study number and ^{14}C labels, were placed in a stock tank on a fenced patio outside a greenhouse. Two treated sunflower seeds were sown in each bucket in the stock tank. On the same day, control (untreated) sunflower seed was planted into four 5-gal buckets prepared in the same manner as the treated buckets. Two control sunflower seeds were planted in each control bucket. The sunflowers were fertilized, watered, and sprayed with maintenance chemicals as necessary to maintain healthy plant growth

Harvest and Sample Preparation of the Sunflower Seed

At maturity, all of the plants were harvested from the control and treated buckets (BBCH 89; 115 days after planting). The sunflowers were cut off approximately 2 cm below the flower's base using garden shears. The treated and control samples were placed into labeled plastic bags and transported to the laboratory. Two fume hoods were lined with plastic and the control and treated samples each placed in separate hoods. The seeds were harvested from the flowers and placed into labeled bags. The seeds were weighed, and stored frozen ($-20\pm 5^\circ\text{C}$) until homogenized. The samples were homogenized in dry ice using a RobotCoupe RSIBX6 (Ridgeland, MS). All samples were returned to frozen storage immediately following homogenization, and the samples remained frozen at all times except during subsampling for analysis.

Storage Stability

Harvested samples of sunflower seed were stored frozen and were radioassayed within 10 days of collection; therefore supporting storage stability data is not required.

C. Analytical Procedures

Extraction and analysis of Samples

Since no sample had total radioactive residues >0.01 mg/kg, no extraction, characterization or identification occurred.

Measurement of Radioactivity

Fifteen aliquots (ca. 0.13 g) each of the homogenized sunflower samples were oxidized using a Packard Tri-Carb Model 307 oxidizer (Packard Instrument Company; Downers Grove, IL) equipped with a Packard Oximate 80 robotic unit (Model A038700; Packard Instrument Company). The resultant $^{14}\text{CO}_2$ was trapped in Carbosorb® E (Packard BioScience Company) admixed with Permafluor® (Packard BioScience Company) and radioassayed.

The method used to measure radioactivity was validated by fortifying control sunflower seed samples with radiolabelled BYF 14182 at approximately 0.05 ppm. Recoveries in 20 samples ranged from 91% to 98%. Assuming the method limit of detection is twice the background level and the average sample size is 0.15 grams, the calculated method limit of detection in sunflower seed is 0.0016 ppm.

II. Results and Discussion

The TRR in sunflower seeds grown from seeds treated at a rate of 18.56 g ai/100 kg seed was <0.0016 ppm (LOD) in all samples.

The submitted study is considered scientifically acceptable. Adequate documentation on the treatment, field and analytical portion of the study has been provided. The data presented were generated using adequately validated methodology.

B.7.16 TRR study in corn

Report:	KIIA 6.2.1 /10; Krolski, M.; M-296646-02-1
Title:	Determination of the Total Radioactive Residue of [Pyrazole-3- ^{14}C] BYF 14182 in Corn following Seed Treatment
Report No & Document No	MEELP045 M-296645-02-1 MRID No. 48023643 PMRA No. 1886068
Guidelines:	US EPA Residue Chemistry Test Guideline OCSPP 860.1300 Nature of the Residue – Plants, Livestock PMRA Residue Chemistry Guidelines DIR98-02: Section 2 Nature of the Residue – Plants, Livestock
GLP:	Yes; Signed and dated GLP statement provided.
Acceptability:	Study is scientifically acceptable

Executive Summary

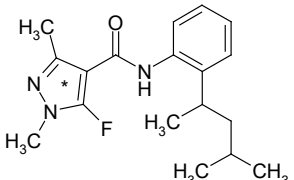
Corn seed, treated with [pyrazole-3- ^{14}C] BYF 14182 at a rate of 8.85 g active ingredient (ai)/100 kg seed, was planted, and corn was grown to maturity. Corn raw agricultural commodities (RACs) were collected at two harvest times: sweet corn kernels plus cobs with husks removed (K+CWHR), sweet corn forage, and field corn forage were collected at

approximately BBCH 75 to 87 (milk stage). Field corn grain and stover samples were collected at crop maturity (BBCH 89). All RAC samples were homogenized and radioassayed. The lower limit of method validation (LLMV) was 0.05 ppm for sweet corn (K+CWHR), sweet corn forage and field corn forage. The LLMV was 0.5 ppm for field corn grain and field corn stover. The limit of detection (LOD) for field corn grain was 0.0024 ppm, for field corn stover was 0.0012 ppm, and for all other RACs was 0.0008 ppm. The TRR in sweet corn (K+CWHR) was <0.0008 ppm, the method LOD for this commodity, in all samples. The average TRR in sweet corn forage was 0.0046 ppm. The TRR in field corn grain was <0.0024 ppm, the method LOD for this commodity, in all samples. The average TRR in field corn forage was 0.0051 ppm and the average TRR in field corn stover was 0.009 ppm.

I. Material and Methods

Materials

Test Material

Chemical structure		* position of the radiolabel
Common Name	Penflufen	
Radiolabelled test material	[Pyrazole-3- ¹⁴ C]BYF 14182	
IUPAC name	N-[2-(1,3-Dimethylbutyl)phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide	
CAS name	5-Fluoro-1,3-dimethyl-1H-pyrazole-4-carboxylic acid [2-(1,3-dimethyl-butyl)-phenyl]-amide	
CAS #	494793-67-8	
Molar Mass	317.4 g·mol ⁻¹	
Specific radioactivity	39.01 mCi/mmol. (4.55 MBq/mg)	
Chemical Purity	> 99%	
Radiochemical purity	> 99%	

Soil

Greenhouse mixture, loam

Plant

Corn; harvested at milk stage for sweet corn and harvested at maturity for field corn RACs.

Study Design

Experimental conditions

Test Facility

This study was conducted by Bayer CropScience at the Bayer Research Park, Stilwell, Kansas, USA in 2007.

Application/Seed Treatment

A [pyrazole-3-¹⁴C]BYF 14182 treating solution was prepared and added to a 10.262-g sample of corn seed (*Zea mays*) seed at a rate of 8.85 g active ingredient (ai)/100 kg seed. Aliquots of the treatment solution were added to seed inside a 250-mL flat bottom flask in 4 portions. The flask was manually mixed between the addition of each portion. Following the final addition, the treating solution container was rinsed with 200 μ L of acetonitrile (ACN). The contents inside the flask were mixed using a rotary evaporator.

Seed Treatment Verification

A 2.805 g aliquot of the treated corn seed was placed into a 100-mL round-bottomed flask, and approximately 50 mL of ACN was added to the sample. The sample was mixed manually and the seeds were separated by filtration through a medium-porosity glass frit. This process was repeated 2 additional times; the ACN extracts were mixed and radioassayed. The solvent-extracted seed was allowed to air-dry at room temperature, and the seed was homogenized using a mortar and pestle. Aliquots of the homogenized seed were also radioassayed.

Planting of the Corn Seed

A total of fifteen, 5-gal plastic buckets with drainage holes in the bottom were filled to a depth of 12 inches with untreated greenhouse soil placed over a 4 inch bed of gravel. The treated buckets were placed in a stock tank on a patio outside a greenhouse. Two treated corn seeds were sown in each of nine of the buckets. The buckets containing the treated seeds were placed inside a stock watering tank on the greenhouse patio. Additionally, six buckets were planted with untreated seed corn to provide control material.

The corn plants were fertilized, watered, and sprayed with maintenance chemicals as necessary to maintain healthy plant growth. Temperatures on the greenhouse patio during the initial of the study were within normal range. However, during the course of the study animals damaged several of the treated and control plants. The plants were then placed inside an enclosed greenhouse for the duration of the study to protect them from scavenging. Unfortunately, the animals again entered the greenhouse and damaged several additional treated and control plants. Consequently, the vent windows on the roof of the greenhouse were manually closed and locked each evening. Temperatures inside the greenhouse during the course of the study were monitored and recorded.

Harvest and Sample Preparation of the Corn Seed

At BBCH 75; 86 days after planting, plants were harvested from 2 control and 4 treated buckets. Sweet corn was hand-picked from two treated and one control plant. The remainder of the aerial portion of the corn plants was collected as sweet corn forage. The husk was removed from the harvested ears and combined with the appropriate forage sample leaving the sweet corn (K+CWHR) samples. Additionally, the entire aerial portion of corn plants (1 control and 2 treated) were collected as field corn forage. The treated and control samples were placed into separate labeled plastic bags and transported to the laboratory. The samples were weighed, and stored frozen ($-20\pm 5^{\circ}\text{C}$) until homogenized.

At BBCH 89; 124 days after planting, the remaining plants were harvested. Corn was hand-picked from 3 treated and 3 control plants. The remaining aerial portions of the corn plants were collected as field corn stover. The husks were removed from the harvested ears and combined with the appropriate stover. The samples were immediately transported to the laboratory where the corn grain was removed from the cobs. The cobs were also combined with the appropriate stover samples. The treated and control samples were weighed and stored frozen

(-20±5°C) until homogenized. Field corn grain samples were manually homogenized using a mortar and pestle in the presence of liquid nitrogen. Sweet corn (K+CWHR), sweet corn forage, field corn forage, and field corn stover samples were homogenized in dry ice using a RobotCoupe RSIBX6 (Ridgeland, MS). All samples were returned to frozen storage immediately following homogenization, and the samples remained frozen at all times except during subsampling for analysis.

Storage Stability

Harvested samples of corn RACs were stored frozen and were radioassayed within 7 days of collection; therefore supporting storage stability data are not required.

C. Analytical Procedures

Extraction and analysis of Samples

Since no sample had total radioactive residues >0.01 mg/kg no extraction, characterization or identification occurred.

Measurement of Radioactivity:

Twenty aliquots (ca. 0.20 g) each of the homogenized samples were oxidized using a Packard Tri-Carb Model 307 oxidizer (Packard Instrument Company; Downers Grove, IL) equipped with a Packard Oximate 80 robotic unit (Model A038700; Packard Instrument Company). The resultant ¹⁴CO₂ was trapped in Carbosorb® E (Packard BioScience Company) admixed with Permafluor® (Packard BioScience Company) and radioassayed.

The method used to measure radioactivity was validated by fortifying corn RACs with radiolabelled BYF 14182. Sweet corn (K+CWHR), sweet corn forage and field corn forage was fortified at 0.05 ppm. Field corn grain and field corn stover was fortified at 0.5 ppm. Results of the method validation are shown in Table 1.

Table 1. Method Validation Data for Sweet and Field Corn Fortified with BYF 14182		
RAC	Fortification Level (ppm)	Range of Recoveries (number of samples)
Sweet Corn (K+CWHR)	0.05 ppm	74% - 102% (n=20)
Sweet Corn Forage	0.05 ppm	96% - 102% (n=20)
Field Corn Forage	0.05 ppm	99% - 102% (n=20)
Field Corn Grain	0.5 ppm	96% - 98% (n=20)
Field Corn Stover	0.5 ppm	77% - 99% (n=20)

Assuming the method limit of detection is twice the background level and the average sample size is 0.1 g for field corn grain, the LOD for that RAC is 0.0024 ppm. The average sample size for field corn stover was 0.2 g yielding an LOD for that RAC of 0.0012 ppm. The average sample size for sweet corn (K+CWHR), sweet corn forage and field corn forage was 0.3 g; therefore, the LOD for those commodities was calculated to be 0.0008 ppm.

II. Results and Discussion

The total radioactive residue (TRR) in sweet and field corn RACs grown from treated seed is shown in Table 2.

Table 2. Total Radioactive Residues in Corn RACs Following Seed Treatment at 8.85 g ai/100 kg seed.		
RAC	TRR range, (ppm)¹	Average TRR (ppm)
Sweet Corn (K+CWHR)	<0.0008 ²	<0.0008
Sweet Corn Forage	0.0036 – 0.0062	0.0046
Field Corn Forage	0.0045 – 0.0060	0.0051
Field Corn Grain	<0.0024 ²	<0.0024
Field Corn Stover	0.0029 – 0.0156	0.0090

¹ TRR values corrected by subtracting the average radioactivity seen in control samples from the radioactivity measured in samples grown from treated seed.

² All samples had corrected TRR values of <LOD; therefore, a range is not reported.

The submitted study is considered scientifically acceptable. Adequate documentation on the treatment, field and analytical portion of the study has been provided. The data presented were generated using adequately validated methodology.

B.7.17 TRR study in cotton

Report:	KIIA 6.2.1 /11; Krolski, M.; M-296645-02-1
Title:	Determination of the Total Radioactive Residue of [Pyrazole-3- ¹⁴ C] BYF 14182 in Cotton following Seed Treatment
Report No & Document No	MEELP047-1 M-296645-02-1 MRID No. 48023644 PMRA No. 1886069
Guidelines:	US EPA Residue Chemistry Test Guideline OCSPP 860.1300 Nature of the Residue – Plants, Livestock PMRA Residue Chemistry Guidelines DIR98-02: Section 2 Nature of the Residue – Plants, Livestock
GLP:	Yes; Signed and dated GLP statement provided
Acceptability:	Study is scientifically acceptable

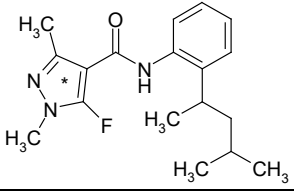
Executive Summary

Cotton seed, treated with [pyrazole-3-¹⁴C] BYF 14182 at a rate of 10.7 g active ingredient (ai)/100 kg seed, was planted, and cotton was grown to maturity. Seed cotton and cotton gin byproducts (gin trash) were collected from the mature cotton. Seed cotton was hand-ginned to generate undelinted cottonseed. The undelinted cottonseed and cotton gin byproducts were homogenized and radioassayed. The lower limit of method validation (LLMV) was 0.01 ppm in cotton seed and cotton gin byproducts. The limit of detection (LOD) for both undelinted cotton seed and cotton gin byproducts was 0.0012 ppm. The total radioactive residue (TRR) in undelinted cottonseed and cotton gin byproducts was <0.0012 ppm, the method LOD, in all samples.

I. Material and Methods

Materials

Test Material

Chemical structure		* position of the radiolabel
Common Name	Penflufen	
Radiolabelled test material	[Pyrazole-3- ¹⁴ C]BYF 14182	
IUPAC name	N-[2-(1,3-Dimethylbutyl)phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide	
CAS name	5-Fluoro-1,3-dimethyl-1H-pyrazole-4-carboxylic acid [2-(1,3-dimethyl-butyl)-phenyl]-amide	

Penflufen – NAFTA GAP Studies Appendix 3
U.S. EPA Review October 2011

CAS #	494793-67-8
Molar Mass	317.4 g·mol ⁻¹
Specific radioactivity	39.01 mCi/mmol. (4.55 MBq/mg)
Chemical Purity	> 99%
Radiochemical purity	> 99%

Soil

Greenhouse mixture, loam

Plant

Cotton (DPL 455BVL)

Study Design

Experimental conditions

Test Facility

This study was conducted by Bayer CropScience at the Bayer Research Park in Stilwell, Kansas, USA in 2007.

Application/Seed Treatment.

A [pyrazole-3-¹⁴C]BYF 14182 treating solution was prepared and added to cotton seed at a rate of 10.7 g active ingredient (ai)/100 kg seed. Aliquots of the treatment solution were added to a 10.26 g sample of cotton seed inside a 250-mL flat bottom flask in 4 portions. The flask was manually mixed between the addition of each portion. Following the final addition, the treating solution container was rinsed with 200 µL of acetonitrile (ACN). The contents inside the flask were mixed and dried using a rotary evaporator.

Seed Treatment Verification

A 2.3035 g aliquot of the batch of treated cotton seed was placed into a 100-mL round-bottomed flask, and approximately 50 mL of ACN was added to the sample. The sample was mixed manually and the seeds were separated by filtration through a medium-porosity glass frit. This process was repeated two additional times, the ACN extracts were mixed and radioassayed. The solvent-extracted seed was allowed to air-dry at room temperature, and the seed was homogenized using a mortar and pestle. Aliquots of the homogenized seed were also radioassayed.

Planting of the Cotton Seed

A total of ten, 5-gal plastic buckets with drainage holes in the bottom were filled to a depth of 12 inches with untreated greenhouse soil placed over a four inch bed of gravel. The treated buckets were placed in a stock tank inside the metabolism greenhouse. Two treated cotton seeds were sown in each of six of the buckets. The buckets containing the treated seeds were placed inside a stock watering tank on the greenhouse patio prior to plant emergence. Additionally, four buckets were planted with untreated cottonseed to provide control material.

The cotton plants were fertilized, watered, and sprayed with maintenance chemicals as necessary to maintain healthy plant growth. Temperatures on the greenhouse patio during the course of the study were monitored.

Harvest and Sample Preparation of the Cotton Seed

All of the plants were harvested at BBCH 89; 132 days after planting, from the control and treated buckets. Cotton was hand-picked from all open bolls; one quarter of the cotton from each boll was collected as the composite seed cotton analytical sample and the remainder was collected as a retain sample. The remaining aerial portions of the cotton plants, except for the main stalk, were collected as cotton gin byproducts (gin trash) to simulate harvest using a mechanical stripper. The samples, treated and controls, were placed onto separate labeled plastic bags and transported to the laboratory. The seed cotton and gin trash samples were weighed, and stored frozen ($-20\pm 5^{\circ}\text{C}$) until homogenized.

Seed cotton samples were ginned manually to generate undelinted cottonseed; the cotton lint was discarded. Undelinted cottonseed samples were manually homogenized using a mortar and pestle in the presence of liquid nitrogen. Gin trash samples were homogenized in dry ice using a RobotCoupe RSIBX6 (Ridgeland, MS). All samples were returned to frozen storage immediately following homogenization, and the samples remained frozen at all times except during subsampling for analysis.

Storage Stability

Harvested samples of cotton seed and cotton gin byproducts were stored frozen and were radioassayed within 7 days of collection; therefore supporting storage stability data are not required.

C. Analytical Procedures

Extraction and analysis of Samples

Since no sample had total radioactive residues >0.01 mg/kg no extraction, characterization or identification occurred.

Measurement of Radioactivity:

Twenty aliquots (ca. 0.20 g) each of the homogenized samples were oxidized were oxidized using a Packard Tri-Carb Model 307 oxidizer (Packard Instrument Company; Downers Grove, IL) equipped with a Packard Oximate 80 robotic unit (Model A038700; Packard Instrument Company). The resultant $^{14}\text{CO}_2$ was trapped in Carbosorb® E (Packard BioScience Company) admixed with Permafluor® (Packard BioScience Company) and radioassayed.

The method used to measure radioactivity was validated by fortifying control cotton seed and cotton gin byproduct samples with radiolabelled BYF 14182. Samples approximately 0.2 grams were fortified at 0.01 ppm. Recoveries in 20 cotton seed samples ranged from 95% to 110%. Recoveries in 20 cotton gin byproduct samples ranged from 104% to 115%. Assuming the method limit of detection is twice the background level and the average sample size is 0.2 grams, the calculated method LOD in cotton seed and cotton gin byproducts is 0.0012 ppm.

II. Results and Discussion

The total radioactive residue in undelinted cottonseed grown from treated seed was <0.0012 ppm, the method LOD, in all samples. The TRR in cotton gin byproducts was also <0.0012ppm, the method LOD, in all samples.

The submitted study is considered scientifically acceptable. Adequate documentation on the treatment, field and analytical portion of the study has been provided. The data presented were generated using adequately validated methodology.

B.7.1.7 TRR in canola

Report:	KIIA 6.2.1 /12; Woodard, D.; M-295916-01-1
Title:	Determination of the Total Radioactive Residue of [Pyrazole-3- ¹⁴ C] BYF 14182 in Canola following Seed Treatment
Report No & Document No	MEELP049 M-295916-01-1 MRID No. 48023645 PMRA No. 1886067
Guidelines:	US EPA Residue Chemistry Test Guideline OCSP 860.1300 Nature of the Residue – Plants, Livestock PMRA Residue Chemistry Guidelines DIR98-02: Section 2 Nature of the Residue – Plants, Livestock
GLP:	Yes; Signed and dated GLP statement provided
Acceptability:	Study is scientifically acceptable

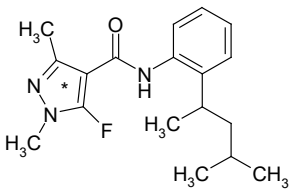
Executive Summary

Canola seed, treated with [pyrazole-3-¹⁴C] BYF 14182 at a rate of 15.65 g active ingredient (ai)/100 kg seed, was planted, and the canola was grown to maturity. The canola was harvested at maturity, the seeds were collected, homogenized and radioassayed. The lower limit of method validation (LLMV) was 0.05 ppm. The method limit of detection (LOD) in canola seed was 0.00064 ppm. The total radioactive residue (TRR) in the mature canola seed was <0.00064 ppm, the method LOD, in all samples.

I. Material and Methods

A. Materials

Test Material

Table 1. Test Material		
Chemical structure		* position of the radiolabel
Common Name	Penflufen	
Radiolabelled test material	[Pyrazole-3- ¹⁴ C]BYF 14182	
IUPAC name	N-[2-(1,3-Dimethylbutyl)phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide	
CAS name	5-Fluoro-1,3-dimethyl-1H-pyrazole-4-carboxylic acid [2-(1,3-dimethyl-butyl)-phenyl]-amide	
CAS #	494793-67-8	
Molar Mass	317.4 g·mol ⁻¹	
Specific radioactivity	39.01 mCi/mmol. (4.55 MBq/mg)	
Chemical Purity	> 99%	
Radiochemical purity	> 99%	

Soil

Greenhouse mixture, loam

Plant

Canola (NK7655)

B. Study Design

Experimental conditions

Test Facility

This study was conducted by Bayer CropScience at the Bayer Research Park in Stilwell, Kansas, USA in 2007.

Application/Seed Treatment

A [pyrazole-3-¹⁴C]BYF 14182 treatment solution was prepared and applied to canola seed at a rate of 15.65 g/100 kg seed. Aliquots of the treatment solution were slowly discharged onto a 10 gram sample of canola seed inside a flat bottom flask. The contents inside the flask were mixed using the Brinkman Buchi RE111 Rotavapor rotary evaporator. The sample was rotary evaporated to dryness after being thoroughly mixed using the rotary evaporator. The procedure was repeated until all of the treatment solution was exhausted. The vial that contained the treating solution was rinsed with 1.0 mL of ACN. The rinse was slowly added to

the canola seed using the same technique as the treating solution. The seed was then allowed to air-dry at room temperature.

Seed Treatment Rate Verification

The initial treating solution was assayed by high performance liquid chromatography (HPLC) and radioassayed. Additionally, a 1.002 g aliquot of the treated canola seeds was placed into a 50-mL plastic centrifuge tube, and approximately 25 mL of ACN was added to the sample. The lid was secured onto the centrifuge tube, and the sample was mixed vigorously, vortexed and sonicated. The supernatant was decanted from the seed into a 100-mL, graduated mixing cylinder. This process was repeated 3 additional times, the ACN extracts were mixed and radioassayed. The solvent-extracted seed was allowed to air-dry at room temperature, and the seed was homogenized using a mortar and pestle. Aliquots (10 mg) of the homogenized seed were also radioassayed.

Planting of the Canola Seed

Two metal stock tanks were filled with 6 inches of gravel and then with untreated greenhouse soil on a patio outside a greenhouse. Untreated canola seeds were planted in one tank; treated in the other. Seeds were planted in 11 rows, 6" apart, 18 seeds per row, each seed 4 cm apart and 1.3 cm deep.

The canola crop was fertilized, watered, and sprayed with maintenance chemicals as necessary to maintain healthy plant growth. Air temperature data were recorded at a nearby weather station.

Harvest and Sample Preparation of the Canola Seed

All of the plants were harvested from the control and treated tanks on at BBCH 89; 84 days after planting. The plants were cut off approximately 2 cm above the soil surface using garden shears. The samples were placed onto labeled tables on plastic and paper towels to dry for 7 days. After that time the control and treated samples were gathered into separate plastic bags and transported to the laboratory. Two fume hoods were lined with plastic and the control and treated samples each placed in separate hoods. The seeds were harvested from the plants and placed into jars. The seeds were weighed, and stored frozen ($-20\pm 5^{\circ}\text{C}$) until homogenized. The samples were homogenized in dry ice using a RobotCoupe RSI 2Y1 (Ridgeland, MS). All samples were returned to frozen storage immediately following homogenization, and the samples remained frozen at all times except during subsampling for analysis.

Storage Stability

Harvested samples of canola were stored frozen and were radioassayed within 10 days of collection; therefore supporting storage stability data are not required.

C. Analytical Procedures

Extraction and analysis of Samples

Since no sample had total radioactive residues >0.01 mg/kg, no extraction, characterization or identification occurred.

Measurement of Radioactivity

Twenty aliquots (ca. 0.30 g) each of the homogenized samples were oxidized using a Packard Tri-Carb Model 307 oxidizer (Packard Instrument Company; Downers Grove, IL) equipped with a Packard Oximate 80 robotic unit (Model A038700; Packard Instrument Company). The resultant $^{14}\text{CO}_2$ was trapped in Carbosorb® E (Packard BioScience Company) admixed with Permafluor® (Packard BioScience Company) and radioassayed.

The method used to measure radioactivity was validated by fortifying control canola seed samples with radiolabelled BYF 14182 at approximately 0.05 ppm. Recoveries in 19 samples ranged from 95% to 101%. Assuming the method limit of detection is twice the background level and the average sample size is 0.3 grams, the calculated method limit of detection in canola seed is 0.00064 ppm.

II. Results and Discussion

The TRR in canola seed grown from seeds treated at a rate of 15.65 g ai/100 kg seed was <0.00064 ppm (LOD) in all samples.

The submitted study is considered scientifically acceptable. Adequate documentation of the treatment, field and analytical portion of the study has been provided. The data presented were generated using adequately validated methodology.

B.7.1.9 TRR study in edible podded legumes

Report:	KIIA 6.2.1 /13;Stoughton, S.; M-357722-01-1
Title:	Determination of the Total Radioactive Residue (TRR) of [Pyrazole-3-14C] BYF 14182 in Edible Podded Legumes following Seed Treatment
Report No & Document No	MEELP079 M-357722-01-1 MRID No. 48023646 PMRA No. 1886065
Guidelines:	US EPA Residue Chemistry Test Guideline OCSPP 860.1300 Nature of the Residue – Plants, Livestock PMRA Residue Chemistry Guidelines DIR98-02: Section 2 Nature of the Residue – Plants, Livestock
GLP:	Yes; Signed and dated GLP statement provided
Acceptability:	Study is scientifically acceptable

Executive Summary

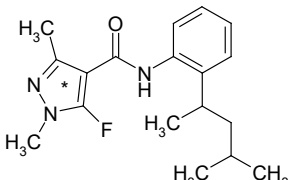
Green bean seeds, treated with [pyrazole-3-14C]BYF 14182 at a rate of 5.51 g active ingredient (ai)/100 kg seed, were planted and grown to maturity and the bean pods and forage were harvested. The bean pods were homogenized and radioassayed. The bean forage was not analyzed. The lower limit of method validation (LLMV) for bean pods was 0.005 ppm. The limit of detection (LOD) for the method in bean pods is calculated to be 0.001 ppm. The

average total radioactive residue (TRR) in bean pods grown from treated seeds was <0.001 ppm, the method LOD.

I. Material and Methods

A. Materials

Test Material

Chemical structure		* position of the radiolabel
Common Name	Penflufen	
Radiolabelled test material	[Pyrazole-3-14C]BYF 14182	
IUPAC name	N-[2-(1,3-Dimethylbutyl)phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide	
CAS name	5-Fluoro-1,3-dimethyl-1H-pyrazole-4-carboxylic acid [2-(1,3-dimethyl-butyl)-phenyl]-amide	
CAS #	494793-67-8	
Molar Mass	317.4 g-mol ⁻¹	
Specific radioactivity	39.01 mCi/mmol (4.55 MBq/mg)	
Chemical Purity	> 99%	
Radiochemical purity	> 99%	

Soil

Greenhouse mixture

Plant

Bush Blue Lake green bean

B. Study Design

Experimental conditions

Test Facility

This study was conducted by Bayer CropScience at the Bayer Research Park in Stilwell, Kansas, USA in 2008.

Application/Seed Treatment

A [pyrazole-3-14C]BYF 14182 treating solution was prepared and applied to green bean seeds at a rate of 5.51 g ai/100 kg seed. Aliquots of the treatment solution were slowly discharged in 200 uL aliquots onto a 25.01-g sample of green bean seeds inside a 250-mL round bottom flask. The contents of the flask were mixed using the Brinkman Büchi RE111 Rotavapor

rotary evaporator. The sample was rotary evaporated to dryness after being thoroughly mixed using the rotary evaporator. The procedure was repeated until all of the treatment solution was exhausted. The vial that contained the treating solution was rinsed with 1.0 mL of ACN. The rinse was added to the bean seed, approximately 200 μ L at a time using the same technique as the treating solution. The contents inside the flask were mixed using the rotary evaporator. The sample was rotary evaporated to dryness after being thoroughly mixed using a Büchi rotary evaporator. The seed was allowed to air-dry at room temperature.

Seed Treatment Verification

A 2.36 g aliquot of the treated green bean seed was placed into a 50-mL plastic centrifuge tube, and approximately 10 mL of ACN was added to the sample. The lid was secured onto the centrifuge tube, and the sample was mixed vigorously, vortexed and sonicated. The supernatant was decanted from the seed into a 100-mL, graduated mixing cylinder. This process was repeated three additional times, the ACN extracts were mixed and radioassayed. The solvent-extracted seed was allowed to air-dry at room temperature, and the seed was homogenized using a mortar and pestle. Aliquots (0.1844g to 0.3094g) of the homogenized seed were radioassayed.

Planting of the Green Beans

A total of eight 5 gallon plastic buckets with drainage holes in the bottom were filled to a depth of 12 inches with untreated greenhouse soil placed over a 4 inch bed of gravel. The buckets were placed in secondary containment tubs. Bean seeds were planted in the buckets, four control buckets (untreated) and four treated buckets. Each bucket was marked with an identification placard which included the study number, test compound, sample type (CTRL or TRTD), and bucket replicate number. The bean plants were fertilized, watered, and sprayed with maintenance chemicals as necessary to maintain healthy plant growth. Temperatures on the greenhouse patio during the course of the study were recorded.

Harvest and Sample Preparation of the Green Beans

At maturity, all of the plants were harvested from the control and treated buckets (BBCH 89; 57 days after planting). The plants were cut off approximately 2 cm above the soil surface using garden shears. The forage samples were placed into tared, labelled plastic bags, weighed, and placed into the freezer. The bean pods were placed into tared, labelled plastic bags then homogenized. The samples were homogenized in dry ice using a RobotCoupe RSI 2Y1 (Ridgeland, MS). All samples were returned to frozen storage immediately following homogenization, and the samples remained frozen at all times except during subsampling for analysis.

Storage Stability

Harvested samples of bean pods were stored frozen and were radioassayed within 10 days of collection; therefore supporting storage stability data are not required.

C. Analytical Procedures

Extraction and analysis of Samples

Since no sample had total radioactive residues >0.01 mg/kg, no extraction, characterization or identification occurred.

Measurement of Radioactivity

Twenty aliquots (0.1778g to 0.2590g) each of the homogenized bean pods (control and treated) were oxidized using a Packard Tri-Carb Model 307 oxidizer (Packard Instrument Company; Downers Grove, IL) equipped with a Packard Oximate 80 robotic unit (Model A038700; Packard Instrument Company). The resultant $^{14}\text{CO}_2$ was trapped in Carbosorb® E (Packard BioScience Company) admixed with Permafluor® (Packard BioScience Company) and radioassayed. The forage was not analyzed.

The method used to measure radioactivity was validated by fortifying control green bean pods with radiolabelled BYF 14182 at approximately 0.005 ppm. Recoveries in 15 samples ranged from 85% to 93%. Assuming the method limit of detection is twice the background level and the average sample size is 0.25 grams, the calculated method limit of detection in bean pods is 0.001 ppm.

II. Results and Discussion

The average TRR in bean pods grown from seeds treated at a rate of 5.51 g ai/100 kg seed was <0.001 ppm, the method LOD.

The submitted study is considered scientifically acceptable. Adequate documentation of the treatment, field and analytical portion of the study has been provided. The data presented were generated using adequately validated methodology.

B.7.1.10 TRR study in peas

Report:	KIIA 6.2.1 /14;Shepherd, J.; M-356467-01-1
Title:	Determination of the Total Radioactive Residue (TRR) of [Pyrazole-3- ^{14}C] BYF 14182 in Peas (Crop Group 6B) following Seed Treatment
Report No & Document No	MEELP080 M-356467-01-1 MRID No. 48023647 PMRA No. 1886070
Guidelines:	US EPA Residue Chemistry Test Guideline OCSP 860.1300 Nature of the Residue – Plants, Livestock PMRA Residue Chemistry Guidelines DIR98-02: Section 2 Nature of the Residue – Plants, Livestock
GLP:	Yes; Signed and dated GLP statement provided
Acceptability:	Study is scientifically acceptable

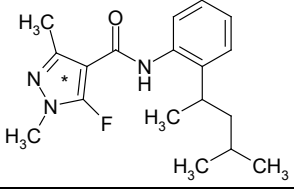
Executive Summary

Pea seed, treated with [pyrazole-3-¹⁴C] BYF 14182 at a rate of 6.81 g active ingredient (ai)/100 kg seed, were planted and grown to maturity and the succulent seed and forage were then harvested. The succulent seeds were homogenized and radioassayed. The forage was not analyzed. The lower limit of method validation (LLMV) was 0.005 ppm for peas. The method limit of detection (LOD) was 0.001 ppm. The total radioactive residue (TRR) in peas grown from treated seed was <0.001 ppm, the method LOD in all samples.

I. Material and Methods

A. Materials

Test Material

Chemical structure		* position of the radiolabel
Common Name	Penflufen	
Radiolabelled test material	[Pyrazole-3- ¹⁴ C]BYF 14182	
IUPAC name	N-[2-(1,3-Dimethylbutyl)phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide	
CAS name	5-Fluoro-1,3-dimethyl-1H-pyrazole-4-carboxylic acid [2-(1,3-dimethyl-butyl)-phenyl]-amide	
CAS #	494793-67-8	
Molar Mass	317.4 g-mol ⁻¹	
Specific radioactivity	39.01 mCi/mmol (4.55 MBq/mg)	
Chemical Purity	> 99%	
Radiochemical purity	> 99%	

Soil

Greenhouse mixture

Plant

Pea (Little Marvel)

B. Study Design

Experimental conditions

Test Facility

This study was conducted by Bayer CropScience at the Bayer Research Park in Stilwell, Kansas, USA in 2008.

Application/Seed Treatment

A [pyrazole-3-¹⁴C]BYF 14182 treatment solution was prepared and applied to pea seed at a rate of 6.81 g ai/100 kg seed. Aliquots of the treatment solution were slowly discharged onto a 20.0 g sample of pea seed inside a 250-mL flat bottom flask. The contents inside the flask were mixed using the Brinkman Büchi RE111 Rotavapor rotary evaporator. The sample was evaporated to dryness after being thoroughly mixed using the rotary evaporator. The procedure was repeated until all of the treatment solution was exhausted. The vial that contained the treating solution was rinsed with two aliquots of 0.20 mL of acetonitrile. The rinse was added to the pea seed using the same technique as the treating solution. The contents inside the flask were mixed using the rotary evaporator. The sample was then rotary evaporated to dryness after being thoroughly mixed. The seed was allowed to air-dry further at room temperature to ensure that all acetonitrile was evaporated before planting

Seed Treatment Verification

A 2.0 g aliquot of the treated pea seeds was placed into a 100-mL round-bottom flask, and approximately 20 mL of acetonitrile was added to the sample. The flask was secured and the sample was mixed vigorously, vortexed and sonicated. The supernatant was decanted from the seed into a 100-mL, graduated mixing cylinder. This process was repeated two additional times, the acetonitrile extracts were mixed and radioassayed. The solvent extracted seed was allowed to air-dry at room temperature, and the seed was homogenized using a mortar and pestle. Aliquots (200 mg) of the homogenized seed were radioassayed.

Planting of the Peas

Eight buckets were filled with a layer of gravel and then with untreated greenhouse soil on a patio outside a greenhouse. The pea seeds were planted in the buckets, four buckets (untreated) and four buckets treated. Seeds were planted in each bucket (4 seeds per bucket) approximately one inch deep. The pea crop was thinned to two plants per bucket approximately three weeks after planting. The pea crop was fertilized, watered, and sprayed with maintenance chemicals as necessary to maintain healthy plant growth. Air temperature data were recorded by a HOBO logger and also at a nearby weather station.

Harvest and Sample Preparation of the Peas

At maturity, all of the plants were harvested from the control and treated tanks (BBCH 79: 64 days after planting). The plants were cut off approximately 2 cm above the soil surface using garden shears. The samples were placed in labeled plastic bags and transferred to the laboratory. The samples were then separated into forage and pea samples, placed into plastic bags and weighed. The samples were homogenized in dry ice using a RobotCoupe RSI 2Y1 (Ridgeland, MS). All samples were returned to frozen storage immediately following homogenization, and the samples remained frozen at all times except during sub-sampling for analysis.

Storage Stability

Harvested samples of peas were stored frozen and were radioassayed within 18 days of collection; therefore supporting storage stability data is not required.

C. Analytical Procedures

Extraction and analysis of Samples

Since no sample had total radioactive residues >0.01 mg/kg, no extraction, characterization or identification occurred.

Measurement of Radioactivity

Fifteen aliquots (0.20 g) each of the homogenized pea seed samples were oxidized using a Packard Tri-Carb Model 307 oxidizer (Packard Instrument Company; Downers Grove, IL) equipped with a Packard Oximate 80 robotic unit (Model A038700; Packard Instrument Company). The resultant $^{14}\text{CO}_2$ was trapped in Carbosorb[®] E (Packard BioScience Company) admixed with Permafluor[®] (Packard BioScience Company) and radioassayed. The forage was not analyzed.

The method used to measure radioactivity was validated by fortifying control pea samples with radiolabelled BYF 14182 at approximately 0.005 ppm. Recoveries in 15 samples ranged from 73% to 103%. Assuming the method limit of detection is twice the background level and the average sample size is 0.2 grams, the calculated method limit of detection in pea seed is 0.001 ppm.

II. Results and Discussion

The TRR in peas grown from seed treated at a rate of 6.81 g ai/100kg seed was <0.001 ppm, the method LOD.

The submitted study is considered scientifically acceptable. Adequate documentation of the treatment, field and analytical portion of the study has been provided. The data presented were generated using adequately validated methodology.

B.7.1.11 TRR study in alfalfa

Report:	KIIA 6.2.1 /15;Nguyen, T.; M-363667-02-1
Title:	Determination of the Total Radioactive Residue (TRR) of [Pyrazole-3- ^{14}C] BYF 14182 in Alfalfa following Seed Treatment
Report No & Document No	MEELP110 M-363667-02-1 MRID No. 48023648 PMRA No. 1886066
Guidelines:	US EPA Residue Chemistry Test Guideline OCSPP 860.1300 Nature of the Residue – Plants, Livestock PMRA Residue Chemistry Guidelines DIR98-02: Section 2 Nature of the Residue – Plants, Livestock
GLP:	Yes; Signed and dated GLP statement provided
Acceptability:	Study is scientifically acceptable

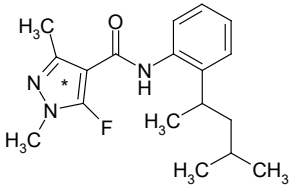
Executive Summary

Alfalfa seeds, treated with [pyrazole-3-¹⁴C] BYF14182 at rates of 3.46 g ai/100 kg and 12.23 g ai/100 kg were planted, grown to maturity and the alfalfa flowers, forage, and hay were harvested. Three sampling intervals of alfalfa forage and two samplings of hay were homogenized and radioassayed. Two samples of whole alfalfa flowers were radioassayed. The lower limit of method validation (LLMV) is 0.015 ppm for alfalfa flowers and is 0.05 ppm for alfalfa forage and hay. The limit of detection (LOD) for alfalfa flowers was 0.004 ppm and was 0.003 ppm for alfalfa forage and hay. The average total radioactive residue (TRR) in alfalfa flowers from the first and third cuttings at both treatment levels was <0.004 ppm (LOD). Flowers were not collected from the second cutting. The average TRR in alfalfa forage from three cuttings at both treatment levels was <0.003 ppm (LOD). The average TRR in alfalfa hay from the last two cuttings at both treatment levels was <0.003 ppm (LOD). Hay was not collected at the first cutting.

I. Material and Methods

A. Materials

Test Material

Chemical structure		* position of the radiolabel
Common Name	Penflufen	
Radiolabelled test material	[Pyrazole-3- ¹⁴ C]BYF 14182	
IUPAC name	N-[2-(1,3-Dimethylbutyl)phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide	
CAS name	5-Fluoro-1,3-dimethyl-1H-pyrazole-4-carboxylic acid [2-(1,3-dimethyl-butyl)-phenyl]-amide	
CAS #	494793-67-8	
Molar Mass	317.4 g-mol ⁻¹	
Specific radioactivity	31.6 mCi/mmol	
Chemical Purity	> 99%	
Radiochemical purity	> 99%	

Soil

Greenhouse mixture

Plant

Alfalfa

B. Study Design

Experimental conditions

Test Facility

This study was conducted by Bayer CropScience at the Bayer Research Park in Stilwell, Kansas, USA in 2009.

Application/Seed Treatment

[Pyrazole-3-¹⁴C] BYF14182 treating solutions were prepared and applied to alfalfa seed at rates of either 3.46 g ai/100 kg or 12.23 g ai/100 kg. For each application rate, an aliquot of the appropriate treatment solution was discharged onto a 10.0-g sample of alfalfa seed inside a 125-mL round bottomed flask. The contents inside the flask were mixed using the Brinkman Büchi RE111 Rotavapor rotary evaporator. The sample was rotary evaporated to dryness after being thoroughly mixed using the rotary evaporator. The procedure was repeated until all of the treatment solution was exhausted. The vial that contained the treating solution was rinsed with 1.0 mL of acetonitrile. The rinse was added to the Alfalfa seed, approximately 250 µL+ at a time using the same technique as the treating solution. The contents inside the flask were mixed using the rotary evaporator. The sample was rotary evaporated to dryness after being thoroughly mixed using a Büchi rotary evaporator.

Seed Treatment Verification

Ten aliquots (10 seeds each) of the treated alfalfa seeds from each rate were removed, weighed and placed into individual combustion cones and analyzed. The amount of [pyrazole-3-¹⁴C] BYF 14182 applied to the seeds at the 5.0 and 15.0 g ai/100 kg target seed treatment rates was determined. When compared to the target treatment rate, the recovery of [pyrazole-3-¹⁴C] BYF 14182 from the alfalfa seed were 69% (3.46 g ai/100 kg seed) and 82% (12.23 g ai/100 kg seed) respectively.

Planting of the Alfalfa Seeds

Treated alfalfa seeds were planted in a stainless steel tank with a surface area of 15 ft² (0.00034 acres; 0.00014 ha). The stainless steel tank was divided into two halves, and one half was planted with the low treatment rate and the other half with the higher treatment rate of alfalfa seeds. The target alfalfa seeding rate was 4 lb of seed per acre. Additionally, a second stainless steel tank was planted with untreated alfalfa seed at a target rate of 4 lb seed per acre to provide control alfalfa. The alfalfa crops were fertilized, watered, and sprayed with maintenance chemicals as necessary to maintain healthy plant growth. Temperatures on the greenhouse patio were monitored and recorded during the course of the study. Between the first and second harvest, under the threat of frost, both treated and control tubs were moved inside to an enclosed greenhouse for the remainder of the study. Temperatures inside the greenhouse during this portion of the study were also monitored and recorded.

Harvest and Sample Preparation of the Alfalfa

For the first harvest, flowers and forage were harvested from the control and treated tanks (BBCH 61: 89 days after planting). Whole flowers were cut from the plant at the base of the flower in the first and third samplings. Subsequently, at all time points, forage was collected

by cutting the plants approximately six inches above the soil surface using garden shears. Hay was not generated from the first sampling; however, the moisture content of the forage was determined for the treated and untreated forage to be 25.17% and 24.55% respectively. In the two subsequent samplings, a portion of the forage was cut and allowed to air-dry to generate hay. All the samples were placed in labeled plastic bags and transferred to the laboratory. The alfalfa was allowed to re-grow and harvested at BBCH 61 two more times as indicated above. Flowers were not homogenized. The forage and hay samples were homogenized in dry ice using a RobotCoupe RSI 2Y1 (Ridgeland, MS). All samples remained frozen at all times except during processing or sub-sampling for analysis.

Storage Stability

Harvested samples of alfalfa were stored frozen and were radioassayed within 10 days of collection; therefore supporting storage stability data are not required.

C. Analytical Procedures

Extraction and analysis of Samples

Since no sample had total radioactive residues >0.01 mg/kg, no extraction, characterization or identification occurred.

Measurement of Radioactivity:

Fifteen aliquots (ca. 0.05-0.40 g) each of the whole alfalfa flowers samples were oxidized and radioassayed from each harvest. Fifteen aliquots (ca. 0.09-0.16 g) each of the homogenized alfalfa forage samples were oxidized and radioassayed from each harvest. Fifteen aliquots (ca. 0.09-0.11 g) each of the homogenized alfalfa hay samples were oxidized and radioassayed. All the samples were oxidized using a Packard Tri-Carb Model 307 oxidizer (Packard Instrument Company; Downers Grove, IL) equipped with a Packard Oximate 80 robotic unit (Model A038700; Packard Instrument Company). The resultant $^{14}\text{CO}_2$ was trapped in Carbosorb[®] E (Packard BioScience Company) admixed with Permafluor[®] (Packard BioScience Company) and radioassayed.

The method used to measure radioactivity was validated by fortifying control samples of alfalfa forage and hay at approximately 0.05 ppm and alfalfa flowers at approximately 0.015 ppm. Recoveries in 10 alfalfa forage samples ranged from 96% - 104%. Recoveries in 10 alfalfa hay samples ranged from 93% - 98%. Recoveries in 15 alfalfa flower samples ranged from 95% - 107%. Assuming the method limit of detection is twice the background level and the sample size is 0.07g for alfalfa flowers, 0.1 g for alfalfa forage and 0.09 g for alfalfa hay, the calculated method limit of detection in alfalfa flowers is 0.004 ppm and in alfalfa forage and hay is 0.003 ppm.

II. Results and Discussion

The TRR in alfalfa flowers, forage and hay grown from seeds treated at either a rate of 3.46 g ai/100 kg seed or 12.23 g ai/100 kg seeds were below the limit of detection of either 0.04 ppm (flowers) or 0.003 ppm (forage and hay) at all cuttings. The TRR data for alfalfa grown from treated seeds are summarized in Table 1.

Table 1. Total Radioactive Residues in Alfalfa Flowers, Forage and Hay			
Matrices	Cutting	Average TRR at low treatment rate¹(ppm)	Average TRR at high treatment rate² (ppm)
Flowers ³	1st	<0.004 ppm	<0.004 ppm
	2nd	NA	NA
	3rd	<0.004 pm	<0.004 ppm
Forage ⁴	1st	<0.003 ppm	<0.003 ppm
	2nd	<0.003 ppm	<0.003 ppm
	3rd	<0.003 ppm	<0.003 ppm
Hay ⁴	1st	NA	NA
	2nd	<0.003 ppm	<0.003 ppm
	3rd	<0.003 ppm	<0.003 ppm

¹Low treatment rate is equivalent to 3.46 g ai/100 kg seed.

²High treatment rate is equivalent to 12.23 g ai/100 kg seed.

³The LOD for flowers is 0.004 ppm.

⁴The LOD for hay and forage is 0.003 ppm.

NA = not collected and/or not analyzed.

The submitted study is considered scientifically acceptable. Adequate documentation of the treatment, field and analytical portion of the study has been provided. The data presented were generated using adequately validated methodology.

B.7.6 Residues resulting from supervised trials

B.7.6.1.1 Magnitude of the Residue in Wheat

Report:	KIIA 6.3.1/01; Gould, T.J., Harbin A. M.; 2010; M-364819-01-1
Title:	BYF 14182 FS240 (red) - Magnitude of the Residue in/on Wheat
Report No.	RAELP049
Document No.:	M-364819-01-1
	MRID No. 48023724
	PMRA No. 1886004
Guidelines:	US EPA Residue Chemistry Test Guideline OCSPP 860.1500, Crop Field Trials PMRA Residue Chemistry Guidelines DIR98-02: Section 9 Crop Field Trials
GLP:	Yes (certified laboratory); Deviations: None
Acceptability	Study is scientifically acceptable

Executive Summary

Field trials were conducted at nine locations to measure the magnitude of penflufen residues in/on the wheat commodities of forage, hay, grain, and straw following the planting of seeds treated with penflufen at a rate of 5 g active ingredient (ai)/100 kg seed.

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homoglutathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labelled internal standards. The method limit of quantitation (LOQ) for penflufen, Pen-3HB and Pen-HGT was 0.01 ppm for each analyte in all wheat matrices.

Individual residues of penflufen, Pen-3HB and Pen-HGT were less than the LOQ (<0.01ppm) on all wheat matrices (forage, hay, grain and straw).

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Proposed Use Pattern

Penflufen (BYF 14182) is to be registered in USA and Canada for use as a seed treatment in wheat. The treatment rate in North America is summarized in Table 6.3.1-1.

Table 6.3.1-1 Use patterns for the spray application of BYF 14182 in/on wheat seed in North America

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Wheat	North America	Seed Treatment	1	5	NA	NA	NA

To support the representative use, a total of 9 residue trials in/on wheat were conducted with seed treated with the formulation PENRED 240FS (BYF 14182 FS240 Red) during the 2008 growing season (Table 6.3.1-2).

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Table 6.3.1-2 Location of North American Wheat trials

Type of formulation*	Crop	NAFTA Region	No. of trials Submitted	No. of Trials Requested ¹		Report No.	Dossier ref.:
				Canada	USA		
240FS	Wheat	5	2	1	1	RAELP049	KIIA 6.3.1/01
		7	3	2	1		
		8	2		2		
		14	2	2			
		Total	9	5	4		

*240FS is a flowable concentrate containing 240 g/L of BYF 14182

¹ The total number of required NAFTA field trials was reduced based on findings in the metabolism and TRR studies during discussions with US EPA (Chem SAC minutes 12/12/2007) and PMRA (PMRA, memorandum Feb. 21, 2008).

Trial site conditions, including soil characteristics are summarized in Table 6.3.1-3.

Table 6.3.1-3 Trial site conditions for Penflufen in/on wheat.

Study Location (City, State)	Trial Number	Soil Characteristics				Meteorological Data ^b	
		Type	% OM	pH	CEC	Total Rainfall (in)	Temp. Range (°F)
Rockwood, Ontario	EL039-08HA	Sandy Loam	3.4	7.5	12.4	17.84	38-77
York, Nebraska	EL040-08HA	Silty Clay Loam	2.5	6.3	20.1	21.64	11-83
Odessa, Saskatchewan	EL041-08HA	Loam	2.5	8.2	NA ^c	11.96	1-26
Velva, North Dakota	EL042-08HA	Loam	4.0	7.6	27.2	10.93	39-83
Dundurn, Saskatchewan	EL043-08HA	Sandy Loam	3.0	7.0	NA ^c	7.74	37-77
Levelland, Texas	EL044-08HA	Sandy Clay Loam	0.4	7.9	13.4	11.16	25-93
Larned, Kansas	EL045-08HA	Loam	2.4	7.6	20.2	27.99	16-88
Indian Head, Saskatchewan	EL046-08HA	Clay	4.3	7.8	NA ^c	9.50	33-77
Alvena, Saskatchewan	EL047-08HA	Clay Loam	3.8	7.9	NA ^c	7.74	37-77

Material and methods:

Field trials were conducted as required to determine the magnitude of the BYF 14182 residue in/on wheat.

Proposed labeled use pattern (GAP) is provided in Table 6.3.1-1. Field trials were conducted at nine locations to measure the magnitude of penflufen {BYF 14182, (*N*-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1*H*pyrazole-4-carboxamide} residues in/on the wheat commodities of forage, hay, grain, and straw following the planting of seeds treated with PENRED 240FS at a rate of 5 g penflufen/100 kg seed. This formulation is a flowable concentrate containing 240 g penflufen/L.

Findings:

Mean recoveries at fortification levels between 0.01 and 0.02 mg/kg penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, SD \leq 20% as shown in Table 6.3.1-4. All results of the method validation are in accordance with the general requirements for residue analytical methods, therefore the method was validated successfully. The method LOQ is 0.01 ppm for each analyte in all wheat matrices. The calculated method limit of detection (LOD) for penflufen, Pen-3HB and Pen-HGT in wheat forage were 0.004 ppm, 0.002 ppm and 0.008 ppm, respectively. The calculated method LOD for penflufen, Pen-3HB and Pen-HGT in wheat hay were 0.004 ppm, 0.002 ppm, and 0.008 ppm, respectively. The calculated method LODs for penflufen, Pen-3HB and Pen-HGT in wheat grain were 0.003 ppm, 0.001 ppm, and 0.006 ppm, respectively. The calculated method LOD for penflufen, Pen-3HB and Pen-HGT in wheat straw were 0.004 ppm, 0.003 ppm, and 0.005 ppm, respectively.

Table 6.3.1-4 Summary of recoveries penflufen (BYF 14182), Pen-3HB, and Pen-HGT from wheat forage, hay, grain, and straw

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Standard % Deviation
Wheat Forage	Pen-3HB	0.010	3	76, 71, 71	73	3
	BYF 14182	0.010	3	74, 70, 75	73	3
	Pen-HGT	0.010	3	66, 69, 78	71	7
Wheat Grain	Pen-3HB	0.010	3	94, 87, 88	90	4
	BYF 14182	0.010	3	92, 78, 96	89	10
	Pen-HGT	0.010	3	97, 87, 69	84	14
Wheat Hay	Pen-3HB	0.010	4	93, 88, 83, 72	84	9
		0.020	2	89, 82	85	NA
	BYF 14182	0.010	4	99, 83, 95, 86	91	8
		0.020	2	89, 96	92	NA
	Pen-HGT	0.010	4	82, 85, 78, 87	83	4
		0.020	2	82, 89	85	NA
Wheat Straw	Pen-3HB	0.010	3	94, 91, 82	89	6
		0.020	3	93, 96, 91	93	2
	BYF 14182	0.010	3	96, 108, 91	98	9
		0.020	3	96, 91, 93	93	2
	Pen-HGT	0.010	3	84, 75, 82	80	5
		0.020	3	82, 85, 92	86	5

NA is not applicable

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.3.1-5.

Table 6.3.1-5 Summary of storage conditions for wheat

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C)^a	Actual Study Duration (days)^b	Limit of Demonstrated Storage Stability (days)^c
BYF 14182, Pen-3HB, and Pen-HGT	Forage	< 0°C	575	264
BYF 14182, Pen-3HB, and Pen-HGT	Hay	< 0°C	581	269
BYF 14182, Pen-3HB, and Pen-HGT	Grain	< 0°C	533	269
BYF 14182, Pen-3HB, and Pen-HGT	Straw	< 0°C	533	264

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KIIA 6.1.1/02, MRID No. 48023721.

Following treatment, the seeds were planted at rates ranging from 82 to 118 lb seed/A (1,150,000 to 1,910,000 seeds/A). The resulting soil application rates were 0.004 to 0.006 lb penflufen/A (0.005 to 0.007 kg penflufen/ha). A control and a treated plot were used in each trial. In all trials, single control samples and duplicate treated samples of the wheat commodities were collected from each plot at normal maturity. Hay was allowed to dry to commercial dryness prior to sampling. Location and detailed use patterns for the trials are provided in Table 6.3.1-6.

Table 6.3.1-6 Study use pattern for Penred 240FS in/on wheat

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^a	Timing ^b	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Rockwood, Ontario Region 5	EL039-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.005 (0.006)	NA	NA	0.005 (0.006)	NA
York, Nebraska Region 5	EL040-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.005 (0.005)	NA	NA	0.005 (0.005)	NA
Odessa, Saskatchewan Region 7	EL041-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.004 (0.005)	NA	NA	0.004 (0.005)	NA
Velva, North Dakota Region 7	EL042-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.005 (0.006)	NA	NA	0.005 (0.006)	NA
Dundurn, Saskatchewan Region 7	EL043-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.004 (0.005)	NA	NA	0.004 (0.005)	NA
Levelland, Texas Region 8	EL044-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.004 (0.005)	NA	NA	0.004 (0.005)	NA
Larned, Kansas Region 8	EL045-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.006 (0.007)	NA	NA	0.006 (0.007)	NA
Indian Head, Saskatchewan Region 14	EL046-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.004 (0.005)	NA	NA	0.004 (0.005)	NA
Alvena, Saskatchewan Region 14	EL047-08HA	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.004 (0.005)	NA	NA	0.004 (0.005)	NA

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homogluthathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards (Method EL-002-P09-01). Individual residues of penflufen and its metabolites are shown in Table 6.3.1-07. Individual residues were less than the LOQ (<0.01 ppm) in all of the wheat matrices (forage, hay, grain, and straw).

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Table 6.3.1-7 Residue data from the wheat trials with penflufen.

Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Forage												
Rockwood, Ontario	EL039-08HA	2008	5	TRTD	Glenn	Forage	13	0.005 (0.006)	43	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
York, Nebraska	EL040-08HA	2008	5	TRTD	Fineway HRW	Forage	21	0.005 (0.005)	210	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Odessa, Saskatchewan	EL041-08HA	2008	7	TRTD	Glenn	Forage	20	0.004 (0.005)	43	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Velva, North Dakota	EL042-08HA	2008	7	TRTD	Glenn	Forage	16	0.005 (0.006)	46	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Dundurn, Saskatchewan	EL043-08HA	2008	7	TRTD	Glenn	Forage	16	0.004 (0.005)	35	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Levelland, Texas	EL044-08HA	2008	8	TRTD	Fineway HRW	Forage	22	0.004 (0.005)	176	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Larned, Kansas	EL045-08HA	2008	8	TRTD	Fineway HRW	Forage	27	0.006 (0.007)	174	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Indian Head, Saskatchewan	EL046-08HA	2008	14	TRTD	Glenn	Forage	19	0.004 (0.005)	36	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Alvena, Saskatchewan	EL047-08HA	2008	14	TRTD	Glenn	Forage	20	0.004 (0.005)	35	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Hay												
Rockwood, Ontario	EL039-08HA	2008	5	TRTD	Glenn	Hay	52	0.005 (0.006)	68	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
York, Nebraska	EL040-08HA	2008	5	TRTD	Fineway HRW	Hay	66	0.005 (0.005)	244	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Odessa, Saskatchewan	EL041-08HA	2008	7	TRTD	Glenn	Hay	63	0.004 (0.005)	68	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Velva, North Dakota	EL042-08HA	2008	7	TRTD	Glenn	Hay	55	0.005 (0.006)	61	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Dundurn, Saskatchewan	EL043-08HA	2008	7	TRTD	Glenn	Hay	81	0.004 (0.005)	65	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Levelland, Texas	EL044-08HA	2008	8	TRTD	Fineway HRW	Hay	65	0.004 (0.005)	227	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Larned, Kansas	EL045-08HA	2008	8	TRTD	Fineway HRW	Hay	21	0.006 (0.007)	238	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Indian Head, Saskatchewan	EL046-08HA	2008	14	TRTD	Glenn	Hay	40	0.004 (0.005)	62	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Alvena, Saskatchewan	EL047-08HA	2008	14	TRTD	Glenn	Hay	87	0.004 (0.005)	64	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Grain												
Rockwood, Ontario	EL039-08HA	2008	5	TRTD	Glenn	Grain	64	0.005 (0.006)	96	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
York, Nebraska	EL040-08HA	2008	5	TRTD	Fineway HRW	Grain	88	0.005 (0.005)	286	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Odessa, Saskatchewan	EL041-08HA	2008	7	TRTD	Glenn	Grain	64	0.004 (0.005)	100	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Velva, North Dakota	EL042-08HA	2008	7	TRTD	Glenn	Grain	91	0.005 (0.006)	111	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Dundurn, Saskatchewan	EL043-08HA	2008	7	TRTD	Glenn	Grain	88	0.004 (0.005)	114	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Levelland, Texas	EL044-08HA	2008	8	TRTD	Fineway HRW	Grain	94	0.004 (0.005)	260	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Larned, Kansas	EL045-08HA	2008	8	TRTD	Fineway HRW	Grain	71	0.006 (0.007)	271	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Indian Head, Saskatchewan	EL046-08HA	2008	14	TRTD	Glenn	Grain	74	0.004 (0.005)	115	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Alvena, Saskatchewan	EL047-08HA	2008	14	TRTD	Glenn	Grain	84	0.004 (0.005)	115	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Straw												
Rockwood, Ontario	EL039-08HA	2008	5	TRTD	Glenn	Straw	51	0.005 (0.006)	96	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
York, Nebraska	EL040-08HA	2008	5	TRTD	Fineway HRW	Straw	80	0.005 (0.005)	286	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Odessa, Saskatchewan	EL041-08HA	2008	7	TRTD	Glenn	Straw	46	0.004 (0.005)	100	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Velva, North Dakota	EL042-08HA	2008	7	TRTD	Glenn	Straw	88	0.005 (0.006)	111	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Dundurn, Saskatchewan	EL043-08HA	2008	7	TRTD	Glenn	Straw	87	0.004 (0.005)	114	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Levelland, Texas	EL044-08HA	2008	8	TRTD	Fineway HRW	Straw	88	0.004 (0.005)	260	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Larned, Kansas	EL045-08HA	2008	8	TRTD	Fineway HRW	Straw	51	0.006 (0.007)	271	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Indian Head, Saskatchewan	EL046-08HA	2008	14	TRTD	Glenn	Straw	50	0.004 (0.005)	115	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Alvena, Saskatchewan	EL047-08HA	2008	14	TRTD	Glenn	Straw	80	0.004 (0.005)	115	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

^a Wheat seeds treated with Penred 240FS at a rate of 5 g of BYF 14182/100 kg seed were planted at seeding rates ranging from 82 to 118 lb seed/A (1,150,000 to 1,910,000 seeds/A), resulting in soil application rates of 0.004 to 0.006 lb penflufen/A (0.005 to 0.007 kg penflufen/ha).

^b PHI = Pre-harvest interval, the interval between planting of the treated seed and harvest of the RAC commodity.

Conclusion

Penred 240FS was applied to wheat seed at 5 g penflufen/100 kg seed. Following treatment, the seeds were planted at seeding rates ranging from 82 to 118 lb seed/A (1,150,000 to 1,910,000 seeds/A), resulting in soil application rates of 0.004 to 0.006 lb penflufen/A (0.005 to 0.007 kg penflufen/ha). Wheat forage (BBCH 21 to BBCH 30, PHIs 35 to 210 days), hay (BBCH 59 to BBCH 73, PHIs 61 to 244 days), grain and straw (BBCH 87 to BBCH 89, 96 to 286 days) were harvested at commercial maturities. Individual residues of penflufen, Pen-3HB and Pen-HGT were less than the LOQ (<0.01ppm) on all wheat matrices (forage, hay, grain and straw).

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.6.1.2 Magnitude of the Residue in Barley

Report:	KIIA 6.3.2/01; Milo, J., Cosgrove, D.; 2010; M-364933-01-1
Title:	BYF 14182 240FS Red – Magnitude of Residues In/On Barley (1X)
Report No.	RAELP035
Document No.:	M-364933-01-1
	MRID No. 48023725
	PMRA No. 1886004
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1500, Crop Field Trials PMRA Residue Chemistry Guidelines DIR98-02: Section 9 Crop Field Trials
GLP	Yes (certified laboratory); Deviations: None
Acceptability	Study is scientifically acceptable

Executive Summary

Field trials were conducted at twelve locations to measure the magnitude of penflufen residues in/on barley grain, hay and straw following the planting of seeds treated with

penflufen at a rate of 5g BYF 14182/100 kg seed.

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homogluthathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards. The method limit of quantitation (LOQ) for penflufen, Pen-3HB and Pen-HGT was 0.01 ppm for each analyte in all barley matrices.

Individual residues of penflufen, Pen-3HB, and Pen-HGT were less than the LOQ (<0.01 ppm) in barley grain, hay and straw.

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Proposed Use Pattern

Penflufen (BYF 14182) is to be registered in USA and Canada for use as a seed treatment in barley. The treatment rate in North America is summarized in Table 6.3.2-1. The actual treatment rate was 5.33 g penflufen /100 Kg seed (1.066X the target rate).

Table 6.3.2-1 Use patterns for BYF 14182 in/on barley seed in North America

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Barley	North America	Seed Treatment	1	5	NA	NA	NA

To support the representative use, a total of 12 residue trials in/on barley were conducted with seed treated with the formulation PENRED 240FS (BYF 14182 FS240 Red) during the 2008 growing season (Table 6.3.2-2).

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Table 6.3.2-2 Location of Barley trials

Type of formulation*	Crop	NAFTA Region	No. of trials Submitted	No. of Trials Requested ^a		Report No.	Dossier ref.:
				Canada	USA		
240FS	Barley	5	2	2	0	RAELP035	KIIA 6.3.2/01
		7	2	2	0		
		14	8	8	0		
		Total	12	12			

*240FS: flowable concentrate containing 240 g/L of BYF 14182

^a The total number of required NAFTA field trials was reduced based on findings in the metabolism and TRR studies during discussions with PMRA (PMRA, memorandum Feb. 21, 2008).

Trial site conditions, including soil characteristics are summarized in Table 6.3.2-3.

Table 6.3.2-3 Trial site conditions for Penflufen in/on Barley

Study Location (City, Prov.)	Study No. – Site No.	Soil Characteristics				Meteorological Data ^b	
		Soil Type	% OM	pH	CEC	Total Rainfall (mm)	Temp. Range (°C)
Rockwood, ON	RAELP035-01-08H	Sandy Loam	3.4	7.5	12.4	452.9	3.4 – 25.0
Breslau, ON	RAELP035-02-08H	Sandy Loam	3.2	7.8	15.3	432.0	3.7 – 26.5
Odessa, SK	RAELP035-03-08H	Loam	2.5	8.2	N/A	276.5	1.0 – 25.6
Francis, SK	RAELP035-04-08H	Loam	3.7	6.0	N/A	276.5	1.0 – 25.6
Indian Head, SK	RAELP035-05-08H	Clay	4.3	7.8	N/A	218.8	0.1 – 25.2
Balcarres, SK	RAELP035-06-08H	Sandy Loam	6.7	7.1	N/A	218.8	0.1 – 25.2
Alvena, SK	RAELP035-07-08H	Clay Loam	3.8	7.9	13.6	216.5	-4.3 – 25.4
Minto, MB	RAELP035-08-08H	Loam	5.4	6.7	21.2	197.1	1.0 – 25.2
Wellwood, MB	RAELP035-09-08H	Clay Loam	4.2	6.6	N/A	518.0	0.8 – 25.4
Innisfail, AB	RAELP035-10-08H	Loam	8.3	6.4	26.4	348.1	3.8 – 24.3
Hepburn, SK	RAELP035-11-08H	Silt Loam	N/A	6.8	18.7	178.6	2.1 – 25.1
Josephburg, AB	RAELP035-12-08H	Clay Loam	9.9	5.7	43.5	250.8	-6.6 – 24.3

NA = Not available

Material and methods

Field trials were conducted as required to determine the magnitude of the BYF 14182 residue in/on barley.

Proposed labeled use pattern (GAP) is provided in Table 6.3.2-1. Field trials were conducted at twelve locations to measure the magnitude of penflufen {BYF 14182, (N-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1Hpyrazole-4-carboxamide} residues in/on the barley commodities of hay, grain, and straw following the planting of seeds treated with PENRED 240FS at a target rate of 5 g penflufen/100 kg seed. This formulation is a flowable concentrate containing 240 g penflufen/L.

Findings:

Mean recoveries at fortification levels between 0.01 and 0.20 mg/kg penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, SD ≤20% as shown in Table 6.3.1-10. All results of the method validation are in accordance with the general requirements for residue analytical methods, therefore the method was validated successfully. The method LOQ for penflufen, Pen-3HB and Pen-HGT is 0.01 ppm for each analyte in all barley matrices. The calculated limit of detection (LOD) for penflufen, Pen-3HB and Pen-HGT in barley hay were 0.002 ppm, 0.003 ppm and, 0.004 ppm, respectively. The calculated LOD for penflufen, Pen-3HB and Pen-HGT in barley grain were 0.002 ppm, 0.002 ppm and 0.006 ppm, respectively. The calculated LOD for penflufen, Pen-3HB and Pen-HGT in barley straw were 0.002 ppm 0.003 ppm and 0.003 ppm, respectively.

Table 6.3.1-10 Summary of recoveries penflufen (BYF 14182), Pen-3HB, and Pen-HGT from Barley hay, grain, and straw

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Stan. % Dev.
Hay	Pen-3HB	0.010	7	98, 93, 90, 92, 91, 76, 87	90%	7%
		0.050	2	95, 87	91%	NA
		0.100	3	95, 92, 90	92%	3%
		0.200	3	95, 91, 92	93%	2%
	Penflufen	0.010	7	86, 83, 87, 74, 88, 95, 81	85%	6%
		0.050	2	97, 84	90%	NA
		0.100	3	85, 99, 82	89%	9%
		0.200	3	92, 98, 96	95%	3%
	Pen-HGT	0.010	7	78, 71, 102, 79, 70, 72, 72	78%	11%
		0.050	2	95, 76	86%	NA
		0.100	3	93, 90, 76	86%	9%
		0.200	3	88, 84, 96	89%	6%
Grain	Pen-3HB	0.010	7	100, 110, 107, 92, 102, 95, 100	101%	6%
		0.050	2	107, 100	104%	NA
		0.200	4	100, 97, 98, 98	98%	1%
	Penflufen	0.010	7	100, 91, 91, 88, 85, 90, 77	89%	7%
		0.050	2	96, 95	95%	NA
		0.200	4	101, 102, 101, 93	99%	4%
	Pen-HGT	0.010	6	118, 112, 91, 74, 104, 99	100%	15%
		0.050	2	79, 103	91%	NA
		0.200	4	92, 100, 86, 84	91%	7%

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Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Stan. % Dev.
Straw	Pen-3HB	0.010	7	83, 85, 100, 108, 102, 94, 104	97%	10%
		0.050	2	88, 87	88%	NA
		0.200	4	95, 95, 95, 99	96%	2%
	Penflufen	0.010	7	91, 84, 97, 89, 84, 93, 73	87%	8%
		0.050	2	94, 97	96%	NA
		0.200	4	99, 96, 96, 101	98%	3%
	Pen-HGT	0.010	6	71, 76, 70, 70, 85, 85	76%	7%
		0.050	2	119, 104	111%	NA
		0.200	4	115, 92, 76, 83	91%	17%

NA is Not Applicable.

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.3.2-5.

Table 6.3.2-5 Summary of storage conditions for Barley

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C) ^a	Actual Study Duration (days) ^b	Limit of Demonstrated Storage Stability (days) ^c
Penflufen, Pen-3HB, and Pen-HGT	Barley hay	< 0°C	458	269
Penflufen, Pen-3HB, and Pen-HGT	Barley Straw	< 0°C	426	264
Penflufen, Pen-3HB, and Pen-HGT	Barley grain	< 0°C	422	269

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KIIA 6.1.1/02, MRID No. 48023721.

Following treatment, the seeds were planted at rates ranging from 95.5 to 123.5 kg seed/ha. The resulting soil application rates were 0.0041 to 0.0055 lb penflufen/A (0.0046 to 0.0062 kg penflufen/ha). A control and a treated plot were used in each trial. In all trials, single control samples and duplicate treated samples of the barley commodities were collected from each plot at normal maturity. Hay was allowed to dry to commercial dryness prior to sampling. Location and detailed use patterns for the trials are provided in Table 6.3.2-6.

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Table 6.3.2-6 Study use pattern for Peflufen in/on Barley

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^a	Timing ^b	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Rockwood, ON Region 5	RAELP035-01-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0045 (0.0051)	NA	NA	0.0045 (0.0051)	NA
Breslau, ON Region 5	RAELP035-02-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0045 (0.0051)	NA	NA	0.0045 (0.0051)	NA
Odessa, SK Region 7	RAELP035-03-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0045 (0.0051)	NA	NA	0.0045 (0.0051)	NA
Francis, SK Region 7	RAELP035-04-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0045 (0.0050)	NA	NA	0.0045 (0.0050)	NA
Indian Head, SK Region 14	RAELP035-05-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0041 (0.0046)	NA	NA	0.0041 (0.0046)	NA
Balcarres, SK Region 14	RAELP035-06-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0043 (0.0049)	NA	NA	0.0043 (0.0049)	NA
Alvena, SK Region 14	RAELP035-07-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0045 (0.0051)	NA	NA	0.0045 (0.0051)	NA
Minto, MB Region 14	RAELP035-08-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0043 (0.0048)	NA	NA	0.0043 (0.0048)	NA
Wellwood, MB Region 14	RAELP035-09-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0055 (0.0062)	NA	NA	0.0055 (0.0062)	NA
Innisfail, AB Region 14	RAELP035-10-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0047 (0.0053)	NA	NA	0.0047 (0.0053)	NA
Hepburn, SK Region 14	RAELP035-11-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0043 (0.0048)	NA	NA	0.0043 (0.0048)	NA
Josephburg, AB Region 14	RAELP035-12-08H	2008	BYF 14182 240FS	Seed Treatment	NA	TRTD	0.0042 (0.0047)	NA	NA	0.0042 (0.0047)	NA

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homoglutathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards (Method EL-002-P09-01). Residues of penflufen and its metabolites are summarized in Table 6.3.2-7. Individual residues of penflufen, Pen-3HB, and Pen-HGT were less than the LOQ (<0.01 ppm) in all of the barley matrices (hay, grain, and straw).

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Table 6.3.2-7 Residue data from the Barley trials with penflufen.

Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	PHI ^b	Penflufen-HGT	Penflufen-3HB	Penflufen
Barley Hay													
Rockwood, ON	01- 08H	Barley	2008	5	TRTD	Metcalfe	Hay	42.66	0.0045 (0.0051)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Breslau, ON	02- 08H	Barley	2008	5	TRTD	Metcalfe	Hay	45.09	0.0045 (0.0051)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Odessa, SK	03- 08H	Barley	2008	7	TRTD	CDC Copeland	Hay	51.90	0.0045 (0.0051)	68	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Francis, SK	04- 08H	Barley	2008	7	TRTD	Legacy	Hay	52.94	0.0045 (0.0050)	61	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, SK	05- 08H	Barley	2008	14	TRTD	CDC Copeland	Hay	72.60	0.0041 (0.0046)	62	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Balcarres, SK	06- 08H	Barley	2008	14	TRTD	Metcalfe	Hay	74.11	0.0043 (0.0049)	72	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	pH ^b	Penflufen-HGT	Penflufen-3HB	Penflufen
Alvena, SK	07-08H	Barley	2008	14	TRTD	Legacy	Hay	67.65	0.0045 (0.0051)	66	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Minto, MB	08-08H	Barley	2008	14	TRTD	Legacy	Hay	84.49	0.0043 (0.0048)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Wellwood, MB	09-08H	Barley	2008	14	TRTD	Metcalfe	Hay	37.16	0.0055 (0.0062)	77	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Innisfail, AB	10-08H	Barley	2008	14	TRTD	Copeland	Hay	81.73	0.0047 (0.0053)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Hepburn, SK	11-08H	Barley	2008	14	TRTD	Legacy	Hay	88.14	0.0043 (0.0048)	63	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Josephburg, AB	12-08H	Barley	2008	14	TRTD	Copeland	Hay	60.77	0.0042 (0.0047)	51	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	pH ^b	Penflufen-HGT	Penflufen-3HB	Penflufen
Barley Grain													
Rockwood, ON	01-08H	Barley	2008	5	TRTD	Metcalfe	Grain	81.57	0.0045 (0.0051)	99	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Breslau, ON	02-08H	Barley	2008	5	TRTD	Metcalfe	Grain	87.31	0.0045 (0.0051)	99	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Odessa, SK	03-08H	Barley	2008	7	TRTD	CDC Copeland	Grain	83.21	0.0045 (0.0051)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Francis, SK	04-08H	Barley	2008	7	TRTD	Legacy	Grain	72.15	0.0045 (0.0050)	101	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, SK	05-08H	Barley	2008	14	TRTD	CDC Copeland	Grain	74.13	0.0041 (0.0046)	93	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Balcarres, SK	06-08H	Barley	2008	14	TRTD	Metcalfe	Grain	77.74	0.0043 (0.0049)	104	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	pH ^b	Penflufen-HGT	Penflufen-3HB	Penflufen
Alvena, SK	07-08H	Barley	2008	14	TRTD	Legacy	Grain	85.38	0.0045 (0.0051)	110	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Minto, MB	08-08H	Barley	2008	14	TRTD	Legacy	Grain	89.67	0.0043 (0.0048)	104	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Wellwood, MB	09-08H	Barley	2008	14	TRTD	Metcalf	Grain	80.08	0.0055 (0.0062)	110	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Innisfail, AB	10-08H	Barley	2008	14	TRTD	Copeland	Grain	87.21	0.0047 (0.0053)	112	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Hepburn, SK	11-08H	Barley	2008	14	TRTD	Legacy	Grain	71.42	0.0043 (0.0048)	98	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Josephburg, AB	12-08H	Barley	2008	14	TRTD	Copeland	Grain	86.42	0.0042 (0.0047)	99	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Barley Straw													
Rockwood, ON	01-08H	Barley	2008	5	TRTD	Metcalf	Straw	62.18	0.0045 (0.0051)	99	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	pH ^b	Penflufen-HGT	Penflufen-3HB	Penflufen
Breslau, ON	02-08H	Barley	2008	5	TRTD	Metcalfe	Straw	65.87	0.0045 (0.0051)	99	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Odessa, SK	03-08H	Barley	2008	7	TRTD	CDC Copeland	Straw	53.76	0.0045 (0.0051)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Francis, SK	04-08H	Barley	2008	7	TRTD	Legacy	Straw	56.44	0.0045 (0.0050)	101	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, SK	05-08H	Barley	2008	14	TRTD	CDC Copeland	Straw	38.16	0.0041 (0.0046)	93	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Balcarres, SK	06-08H	Barley	2008	14	TRTD	Metcalfe	Straw	54.43	0.0043 (0.0049)	104	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Alvena, SK	07-08H	Barley	2008	14	TRTD	Legacy	Straw	60.54	0.0045 (0.0051)	110	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Minto, MB	08-08H	Barley	2008	14	TRTD	Legacy	Straw	82.06	0.0043 (0.0048)	104	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	PHI ^b	Penflufen-HGT	Penflufen-3HB	Penflufen
Wellwood, MB	09- 08H	Barley	2008	14	TRTD	Metcalfe	Straw	73.96	0.0055 (0.0062)	110	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Innisfail, AB	10- 08H	Barley	2008	14	TRTD	Copeland	Straw	59.40	0.0047 (0.0053)	112	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Hepburn, SK	11- 08H	Barley	2008	14	TRTD	Legacy	Straw	47.29	0.0043 (0.0048)	98	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Josephburg, AB	12- 08H	Barley	2008	14	TRTD	Copeland	Straw	79.58	0.0042 (0.0047)	99	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

^a barley seeds treated with Penred 240FS at a rate of 5.33 g of BYF 14182/100 kg seed (1.06X target rate) were planted at seeding rates ranging from 95.5 to 123.5 Kg seed/ha resulting in soil application rates of 0.0041 to 0.0055 lb penflufen/A (0.0046 to 0.0062 kg penflufen/ha).

^b PHI = Pre-harvest interval, the interval between planting of the treated seed and harvest of the RAC commodity.

Conclusion:

Penred 240FS was applied to barley seed at a use rate of 5.33 g penflufen/100 kg seed (1.06X the target rate of 5 g penflufen/100 kg seed). Following treatment, the seeds were planted at seeding rates ranging from 95.5 to 123.5 Kg seed/ha resulting in soil application rates of 0.0041 to 0.0055 lb penflufen/A (0.0046 to 0.0062 kg penflufen/ha). Grain and straw samples were collected at BBCH 87 to 89 (hard dough to fully ripe) 98 to 112 days after planting. Hay samples were cut 51 to 87 days after planting at a crop growth stage of approximately BBCH 63 – 84 (flowering, 30% anthers mature to soft dough stage) and allowed to dry. Samples were evaluated for residues of penflufen and its metabolites. Individual residues of penflufen, Pen-HGT and Pen-3HB were all less than the LOQ (<0.01 ppm) in all of the barley matrices (hay, grain, and straw).

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.6.1.3 Magnitude of the Residue in Corn

Report:	KIIA 6.3.3/01; Krolski, M.E., Harbin, H.; 2010; M-364628-01-1
Title:	BYF 14182 FS240 (red) - Magnitude of the Residue in/on Field Corn and Sweet Corn (CG 15 and 16)
Report No.	RAELP053
Document No.:	M-364628-01-1
	MRID No. 48023726
	PMRA No. 1885997
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1500, Crop Field Trials PMRA Residue Chemistry Guidelines DIR98-02: Section 9 Crop Field Trials
GLP	Yes (certified laboratory); Deviations: None
Acceptability	Study is scientifically acceptable

Executive Summary

Field trials were conducted at nine locations to measure the magnitude of penflufen {BYF 14182, (*N*-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1*H*pyrazole-4-

carboxamide} residues in/on sweet corn ears and forage (target maturity BBCH 73), field corn forage (target maturity BBCH 85), corn grain, and corn stover (target maturity BBCH 89) following the planting of seeds treated with penflufen at a rate of 10 g BYF 14182/100 kg seed.

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homoglutathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards. The method limit of quantitation (LOQ) for penflufen, Pen-3HB and Pen-HGT was 0.01 ppm for each analyte in all corn matrices.

Individual residues of BYF 1412 (penflufen) and its metabolites, Pen-3HB and Pen-HGT, were less than the LOQ (<0.01 ppm) in all of the corn matrices (sweet corn forage, sweet corn K+CWHR, field corn forage, field corn grain and stover/fodder).

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Proposed Use Pattern

Penflufen (BYF 14182) is to be registered in USA and Canada for use as a seed treatment in field and sweet corn. The treatment rate in North America is summarized in Table 6.3.3-1.

Table 6.3.3-1 Use patterns for the spray application of BYF 14182 in/on corn seed in North America

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Corn	North America	Seed Treatment	1	10	NA	NA	NA

Corn Field Trials

To support the representative use, a total of nine residue trials in/on field and sweet corn were conducted with seed treated with the formulation PENRED 240FS (BYF 14182 FS240 Red) during the 2008 growing season (Table 6.3.3-2).

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Table 6.3.3-2 Location of Corn trials

Type of formulation	Crop	NAFTA Region	Corn Trials			Report No.	Dossier ref.:
			Submitted	Requested ¹			
				Canada	US		
240FS*	Corn	1	1		1	RAELP053	KIIA 6.3.3/01
		5	7	1	6		
		11	1		1		
		Total	9	1	8		

*240FS: flowable concentrate containing 240 g/L of BYF 14182 (Penflufen)

¹ The total number of required NAFTA field trials was reduced based on findings in the metabolism and TRR studies during discussions with US EPA (Chem SAC minutes 12/12/2007) and PMRA (PMRA, memorandum Feb. 21, 2008).

Trial site conditions, including soil characteristics are summarized in Table 6.3.3-3.

Table 6.3.3-3 Trial site conditions for Penred 240FS in/on Field and Sweet Corn

Study Location (City, State)	Trial Number	Crop	Soil Characteristics ^a				Meteorological Data ^b	
			Type	% OM	pH	CEC	Total Rainfall (in)	Average Temp. Range (°F)
North Rose, NY	EL067-08HA	Sweet Corn	Sandy Loam	7.6	5.6	12.8	21.04	38-79
Rockwood, ON	EL068-08HA	Field Corn	Sandy Loam	3.4	7.5	12.4	24.46	36-77
Clarence, MO	EL069-08HA	Field Corn	Silty Clay Loam	2.0	6.4	19.1	45.10	43-85
Springfield, NE	EL070-08HA	Field Corn	Silt Loam	2.1	7.1	12.7	30.47	36-85
Richland, IA	EL071-08HA	Field Corn	Silty Clay Loam	4.9	6.5	23.7	36.13	41-83
Carlyle, IL	EL072-08HA	Field Corn	Silt Loam	2.2	7.2	13.0	21.10	45-87
Gardner, KS	EL073-08HA	Field Corn	Silt Loam	3.2	7.2	19.2	32.95	45-88
Sheridan, IN	EL074-08HA	Field Corn	Silt Loam	2.0	5.6	11.0	20.27	42-87
Rupert, ID	EL075-08HA	Sweet Corn	Sandy Loam	0.8	7.1	12.6	7.66	13-88

Material and methods

Proposed labeled use pattern (GAP) is provided in Table 6.3.3-1. Field trials were conducted at nine locations to measure the magnitude of penflufen {BYF 14182, (N-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1Hpyrazole-4-carboxamide} residues in/on sweet corn ears and forage (target maturity BBCH 73), field corn forage (target maturity BBCH 85), corn grain, and corn stover (target maturity BBCH 89) following the planting of seeds treated with Penred 240FS at a rate of 10 g BYF 14182/100 kg seed. This formulation is a flowable concentrate containing 240 g penflufen/L.

The treated plot was planted with corn seed treated with Penred 240FS by Bayer CropScience Seed and Technology Center using procedures typical of commercial seed treatment operations. Following treatment, the seeds were planted at seeding rates ranging from 13.4 to 27.2 lb seed/A (23,400 to 53,000 seeds/A), resulting in rates ranging from 0.001 to 0.003 lb BYF 14182/A (0.002 to 0.003 kg BYF 14182/ha). A control and a treated plot were used in each trial. In all trials, single control samples and duplicate treated samples of the corn commodities were collected from each plot at normal maturity. Location and detailed use patterns for the trials are provided in Table 6.3.3-6.

Findings

Mean recoveries at fortification levels between 0.01 and 0.10 mg/kg penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, SD $\leq 20\%$ as shown in Table 6.3.3-4. All results of the method validation are in accordance with the general requirements for residue analytical methods, therefore the method was validated successfully. The method LOQ for penflufen, Pen-3HB and Pen-HGT was 0.01 ppm for each analyte in all corn matrices. The calculated method limit of detection (LOD) for penflufen, Pen-3HB and Pen-HGT in corn (K+CWHR) were 0.002 ppm, 0.002 ppm, and 0.003 ppm, respectively. The calculated method LOD for penflufen, Pen-3HB and Pen-HGT in sweet and field corn forage were 0.004 ppm, 0.002 ppm, and 0.002 ppm, respectively. The calculated method LOD for penflufen, Pen-3HB and Pen-HGT in corn grain were 0.004 ppm for all analytes. The calculated method LOD for penflufen, Pen-3HB and Pen-HGT in corn stover were 0.003 ppm, 0.002 ppm, and 0.002 ppm, respectively.

Table 6.3.3-4 Summary of recoveries penflufen (BYF 14182), Pen-3HB, and Pen-HGT from Corn commodities

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Standard % Deviation
Corn Fodder	Pen-3HB	0.010	9	104, 97, 104, 86, 105, 106, 91, 90, 104	98	8
		0.100	3	92, 87, 83	87	5
	BYF 14182	0.010	9	98, 71, 74, 76, 84, 84, 85, 100, 85	84	10
		0.100	3	94, 92, 87	91	4
	Pen-HGT	0.010	9	99, 91, 82, 94, 81, 85, 82, 80, 89	87	7
		0.100	3	88, 85, 84	86	2
Corn Forage	Pen-3HB	0.010	7	89, 88, 102, 84, 89, 87, 82	89	6
		0.100	4	93, 90, 100, 89	93	5
	BYF 14182	0.010	7	75, 92, 102, 90, 91, 87, 116	93	13
		0.100	4	81, 92, 91, 95	90	6
	Pen-HGT	0.010	7	90, 89, 93, 93, 98, 98, 100	94	4
		0.100	4	87, 89, 100, 88	91	6
Corn Grain	Pen-3HB	0.010	8	107, 99, 96, 71, 108, 104, 102, 106	99	12
		0.100	4	102, 105, 96, 103	101	4

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Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Standard % Deviation
	BYF 14182	0.010	8	102, 86, 108, 72, 98, 89, 73, 76	88	14
		0.100	4	102, 105, 93, 99	100	5
	Pen-HGT	0.010	8	92, 76, 101, 76, 99, 94, 93, 101	92	10
		0.100	4	98, 92, 97, 94	95	3
Corn KCWHR	Pen-3HB	0.010	7	90, 90, 91, 94, 103, 87, 86	91	6
		0.100	4	89, 95, 94, 98	94	4
	BYF 14182	0.010	7	91, 83, 83, 82, 99, 80, 81	86	7
		0.100	4	94, 90, 94, 95	93	2
	Pen-HGT	0.010	7	104, 98, 99, 98, 98, 87, 83	95	8
		0.100	4	89, 93, 90, 94	91	2

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.3.3-5.

Table 6.3.3-5 Summary of storage conditions for Corn commodities

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C) ^a	Actual Study Duration (days) ^b	Limit of Demonstrated Storage Stability (days) ^c
BYF 14182, Pen-3HB, and Pen-HGT	Forage	< 0°C	475	264
BYF 14182, Pen-3HB, and Pen-HGT	Ears	< 0°C	475	269
BYF 14182, Pen-3HB, and Pen-HGT	Grain	< 0°C	468	269
BYF 14182, Pen-3HB, and Pen-HGT	Stover	< 0°C	414	264

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KIIA 6.1.1/02, MRID No. 48023721.

Table 6.3.3-6 Study use pattern for Penred 240FS in/on Corn

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^a	Timing ^b	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
North Rose, NY Region 1	EL067-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.001 (0.002)	NA	NA	0.001 (0.002)	NA
Rockwood, ON Region 5	EL068-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	NA
Clarence, MO Region 5	EL069-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.001 (0.002)	NA	NA	0.001 (0.002)	NA
Springfield, NE Region 5	EL070-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	NA
Richland, IA Region 5	EL071-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	NA
Carlyle, IL Region 5	EL072-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.001 (0.002)	NA	NA	0.001 (0.002)	NA
Gardner, KS Region 5	EL073-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.001 (0.002)	NA	NA	0.001 (0.002)	NA
Sheridan, IN Region 5	EL074-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	NA
Rupert, ID Region 11	EL075-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.003 (0.003)	NA	NA	0.003 (0.003)	NA

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homogluthathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards (Method EL-002-P09-01). Individual residues of penflufen and its metabolites, Pen-3HB and Pen-HGT, were less than the LOQ (<0.01 ppm) in all of the corn matrices (sweet corn forage, sweet corn K+CWHR, field corn forage, field corn grain and stover/fodder). Individual residues of penflufen and its metabolites are shown in Table 6.3.3-7.

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Table 6.3.3-7 Residue data from the Corn trials with penflufen.

Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Ears (K+CWHR)BBCH 73 - 79												
North Rose, NY	EL067-08HA	2008	1	TRTD	Renaissance	Ears K+CWHR	NA	0.001 (0.002)	112	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rockwood, ON	EL068-08HA	2008	5	TRTD	TR2636RR x TR360	Ears K+CWHR	NA	0.002 (0.002)	104	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Clarence, MO	EL069-08HA	2008	5	TRTD	08HYBB 108REMF	Ears K+CWHR	NA	0.001 (0.002)	88	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Springfield, NE	EL070-08HA	2008	5	TRTD	08HYBB 108REMF	Ears K+CWHR	NA	0.002 (0.002)	93	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Richland, IA	EL071-08HA	2008	5	TRTD	08HYBB 108REMF	Ears K+CWHR	NA	0.002 (0.002)	97	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Carlyle, IL	EL072-08HA	2008	5	TRTD	08HYBB 108REMF	Ears K+CWHR ^c	NA	0.001 (0.002)	97	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Gardner, KS	EL073-08HA	2008	5	TRTD	08HYBB 108REMF	Ears K+CWHR	NA	0.001 (0.002)	75	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Sheridan, IN Region 5	EL074-08HA ^d	Sweet Corn Ears not collected from this field trial										
Rupert, ID	EL075-08HA	2008	11	TRTD	Renaissance F1	Ears K+CWHR	NA	0.003 (0.003)	84	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Sweet Corn Forage BBCH 73 - 79												
North Rose, NY	EL067-08HA	2008	1	TRTD	Renaissance	Sweet Corn Forage	18	0.001 (0.002)	112	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rockwood, ON	EL068-08HA	2008	5	TRTD	TR2636RR x TR360	Sweet Corn Forage	24	0.002 (0.002)	104	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Clarence, MO	EL069-08HA	2008	5	TRTD	08HYBB 108REMF	Sweet Corn Forage	26	0.001 (0.002)	88	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Springfield, NE	EL070-08HA	2008	5	TRTD	08HYBB 108REMF	Sweet Corn Forage	23	0.002 (0.002)	93	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Richland, IA	EL071-08HA	2008	5	TRTD	08HYBB 108REMF	Sweet Corn Forage	22	0.002 (0.002)	97	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Carlyle, IL	EL072-08HA	2008	5	TRTD	08HYBB 108REMF	Sweet Corn Forage ^c	25	0.001 (0.002)	97	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Gardner, KS	EL073-08HA	2008	5	TRTD	08HYBB 108REMF	Sweet Corn Forage	26	0.001 (0.002)	75	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Sheridan, IN Region 5	EL074-08HA ^d	Sweet Corn Forage not collected from this field trial										

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Rupert, ID	EL075-08HA	2008	11	TRTD	Renaissance F1	Sweet Corn Forage	19	0.003 (0.003)	84	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Forage BBCH85												
North Rose, NY	EL067-08HA	2008	1	TRTD	Renaissance	Field Corn Forage	27	0.001 (0.002)	124	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rockwood, ON	EL068-08HA	2008	5	TRTD	TR2636RR x TR360	Field Corn Forage	41	0.002 (0.002)	139	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Clarence, MO	EL069-08HA	2008	5	TRTD	08HYBB 108REMF	Field Corn Forage	29	0.001 (0.002)	101	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Springfield, NE	EL070-08HA	2008	5	TRTD	08HYBB 108REMF	Field Corn Forage	34	0.002 (0.002)	93	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Richland, IA	EL071-08HA	2008	5	TRTD	08HYBB 108REMF	Field Corn Forage	30	0.002 (0.002)	112	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Carlyle, IL	EL072-08HA	2008	5	TRTD	08HYBB 108REMF	Field Corn Forage	42	0.001 (0.002)	97	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Gardner, KS	EL073-08HA	2008	5	TRTD	08HYBB 108REMF	Field Corn Forage	39	0.001 (0.002)	102	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Sheridan, IN	EL074-08HA	2008	5	TRTD	08HYBB 108REMF	Field Corn Forage	31	0.002 (0.002)	117	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rupert, ID	EL075-08HA	2008	11	TRTD	Renaissance F1	Field Corn Forage	28	0.003 (0.003)	112	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Grain (BBCH 89)												
North Rose, NY	EL067-08HA	2008	1	TRTD	Renaissance	Grain	81	0.001 (0.002)	158	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rockwood, ON	EL068-08HA	2008	5	TRTD	TR2636RR x TR360	Grain	64	0.002 (0.002)	150	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Clarence, MO	EL069-08HA	2008	5	TRTD	08HYBB 108REMF	Grain	81	0.001 (0.002)	163	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Springfield, NE	EL070-08HA	2008	5	TRTD	08HYBB 108REMF	Grain	75	0.002 (0.002)	147	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Richland, IA	EL071-08HA	2008	5	TRTD	08HYBB 108REMF	Grain	72	0.002 (0.002)	145	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Carlyle, IL	EL072-08HA	2008	5	TRTD	08HYBB 108REMF	Grain	78	0.001 (0.002)	140	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Gardner, KS	EL073-08HA	2008	5	TRTD	08HYBB 108REMF	Grain	80	0.001 (0.002)	142	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Sheridan, IN	EL074-08HA	2008	5	TRTD	08HYBB 108REMF	Grain	77	0.002 (0.002)	165	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rupert, ID	EL075-08HA	2008	11	TRTD	Renaissance F1	Grain	81	0.003 (0.003)	191	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Fodder (Stover) BBCH 89												
North Rose, NY	EL067-08HA	2008	1	TRTD	Renaissance	Fodder (Stover)	30	0.001 (0.002)	158	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rockwood, ON	EL068-08HA	2008	5	TRTD	TR2636RR x TR360	Fodder (Stover)	35	0.002 (0.002)	150	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Clarence, MO	EL069-08HA	2008	5	TRTD	08HYBB 108REMF	Fodder (Stover)	51	0.001 (0.002)	163	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Springfield, NE	EL070-08HA	2008	5	TRTD	08HYBB 108REMF	Fodder (Stover)	37	0.002 (0.002)	147	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Richland, IA	EL071-08HA	2008	5	TRTD	08HYBB 108REMF	Fodder (Stover)	42	0.002 (0.002)	145	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

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Location (City, State)	Trial Number	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI (Days) ^b	Residue (ppm)		
										BYF 14182	Pen-3HB	Pen-HGT
Carlyle, IL	EL072-08HA	2008	5	TRTD	08HYBB 108REMF	Fodder (Stover)	49	0.001 (0.002)	140	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Gardner, KS	EL073-08HA	2008	5	TRTD	08HYBB 108REMF	Fodder (Stover)	51	0.001 (0.002)	142	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Sheridan, IN	EL074-08HA	2008	5	TRTD	08HYBB 108REMF	Fodder (Stover)	56	0.002 (0.002)	165	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01
Rupert, ID	EL075-08HA	2008	11	TRTD	Renaissance F1	Fodder (Stover)	72	0.003 (0.003)	191	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01	<0.01 <0.01 Average: <0.01

^a Corn seeds treated with BYF 14182 FS240 at a rate of 10 g of BYF 14182/100 kg seed were planted at seeding rates ranging from 13.4 to 27.2 lb seed/A (23,400 to 53,000 seeds/A), resulting in soil application rates of 0.001 to 0.003 lb BYF 14182/A (0.002 to 0.003 kg BYF 14182/ha).

^b PHI = Pre-harvest interval, the interval between planting of the treated seed and harvest of the RAC commodity.

^c Trial EL072-08HA collected ears (K+CWHR) and sweet corn forage at BBCH 83, later than the protocol-requested growth stage of BBCH 73 to BBCH 79.

^d Trial EL074-08HA, in deviation to the protocol, did not collect ears and sweet corn forage.

Conclusion

Penred 240FS was applied to corn seed at 10 g penflufen/100 kg seed. Following treatment, the seeds were planted at seeding rates ranging from 13.4 to 27.2 lb seed/A (23,400 to 53,000 seeds/A), resulting in soil application rates of 0.001 to 0.003 lb BYF 14182/A (0.002 to 0.003 kg BYF 14182/ha). Corn ears and forage (BBCH 73 to BBCH 83, PHIs 75 to 112 days), field corn forage (BBCH 85, PHIs 93 to 139 days), corn grain and stover (BBCH 89, 140 to 191 days) were harvested at commercial maturities and analyzed for total BYF 14182 residues. The individual residues of penflufen and its metabolites Pen-3HB and Pen-HGT were less than the LOQ (<0.01 ppm) in all of the corn matrices (sweet corn ears and forage, field corn forage, corn grain and corn stover).

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.6.1.4 Magnitude of the Residue in Legume Vegetables

Report:	KIIA 6.3.4/01; Beedle, E.C., Harbin, A.M.; 2010; M-364821-01-1
Title:	BYF 14182 FS240 (red) - Magnitude of the Residue in/on Legume Vegetables and Foliage of Legume Vegetables (Crop Groups 6 and 7, Except Soybeans)
Report No.	RAELP050
Document No.:	M-364821-01-1
	MRID No. 48023727
	PRMA No. 1886002
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1500, Crop Field Trials PMRA Residue Chemistry Guidelines DIR98-02: Section 9 Crop Field Trials
GLP	Yes (certified laboratory); Deviations: None
Acceptability	Study is scientifically acceptable

Executive Summary

Twenty residue trials were conducted, five on succulent pea, seven on dry pea, three on succulent bean and five on dry bean, to measure the magnitude of penflufen (BYF 14182)

residues in/on succulent and dry peas and beans and the foliage of peas and beans following the planting of seeds treated with penflufen at a rate of 5 g active ingredient (ai)/100 kg seed.

The residues of BYF 14182 (penflufen) and its metabolites, BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homogluthathione (Pen-HGT), were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards. Individual residues of penflufen and its metabolites, Pen-3HB and Pen-HGT were less than the LOQ (<0.01 ppm) in succulent and dry peas, succulent and dry beans and the foliage of peas and beans (dry bean forage, dry bean hay, dry pea vines, and dry pea hay).

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Proposed Use Pattern

Penflufen (BYF 14182) is to be registered in USA and Canada for use as a seed treatment in succulent and dried legumes. The treatment rate in North America is summarized in Table 6.3.4-1.

Table 6.3.4-1 Use patterns for the spray application of BYF 14182 in/on legumes in North America

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Legumes	North America	Seed Treatment	1	5	NA	NA	NA

To support the representative use, a total of twenty residue trials in/on dry and succulent peas and beans were conducted with seed treated with the formulation PENRED 240FS (BYF 14182 FS240 Red) during the 2008 growing season (Table 6.3.4-2).

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Table 6.3.4-2 Location of Legume Trials

NAFTA Growing Region ^a	Succulent Bean		Succulent Pea		Dry Bean		Dry Pea	
	Submitted	Requested	Submitted	Requested	Submitted	Requested	Submitted	Requested
1	1	1	2	2				
5	2	2	3	3	2	2	1: vines, hay 1: vines, hay, seed ^c	2
7A					1	1		
11					1: hay & seed 1: forage, hay, seed ^b	1 ^d	1	1
14							4	
Total	3	3	5	5	4 forage 5 hay, seed^{b,e}	4	7 vines, hay 6 seed^{c,e}	7

^a The total number of required NAFTA field trials was reduced based on findings in the metabolism and TRR studies during discussions with US EPA (Chem SAC minutes 12/12/2007) and PMRA (PMRA, memorandum Feb. 21, 2008).

^b Dry bean trial EL059-08HA did not collect forage, so an additional Region 11 trial was initiated which collected dry bean forage, hay, and seed. Data for dry bean forage was collected from four trials, and data for dry bean hay and seed were collected from five trials.

^c The seed samples from dry pea trial EL061-08HA were lost during storage at BRP. Data for dry pea vines and hay were collected seven trials, and data for dry pea seed were collected from six trials.

^d One trial from either Region 10 or Region 11 is requested.

^e Overall, pea and bean seed samples were collected from 19 trials compared with 19 requested trials. Pea and bean forage (vines) samples were collected from 11 trials compared with 11 requested trials. Pea and bean hay samples were collected from 12 trials compared with 11 requested trials.

Trial site conditions, including soil characteristics are summarized in Table 6.3.4-3.

Table 6.3.4-3 Trial site conditions for PENRED 240FS in/on Succulent and dry peas and beans

Study Location (City, State)	Trial Number	Crop	Soil Characteristics				Meteorological Data ^a	
			Type	% OM	pH	CEC	Total Rainfall (in)	Temp. Range (°F)
Germansville, Pennsylvania	EL048-08HA	Succulent Bean	Clay Loam	2.2	7.0	9.5	9.68	46-92
Gardner, Kansas	EL049-08HA	Succulent Bean	Silt Loam	2.7	6.2	15	20.28	53-88
Branchton, Ontario	EL050-08HA	Succulent Bean	Loam	1.0	6.2	5.4	21.70	41-80
North Rose, New York	EL051-08HA	Succulent Pea	Sandy Loam	3.4	7.4	11	8.12	41-82
North Rose, New York	EL052-08HA	Succulent Pea	Sandy Loam	7.6	5.6	13	8.82	43-79
Rockwood, Ontario	EL053-08HA	Succulent Pea	Sandy Loam	3.4	7.5	12	13.26	38-77

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Study Location (City, State)	Trial Number	Crop	Soil Characteristics				Meteorological Data ^a	
			Type	% OM	pH	CEC	Total Rainfall (in)	Temp. Range (°F)
Conklin, Michigan	EL054-08HA	Succulent Pea	Loam	1.8	6.4	7.6	10.67	43-78
Branchton, Ontario	EL055-08HA	Succulent Pea	Loam	1.0	6.2	5.4	15.00	41-80
Rockwood, Ontario	EL056-08HA	Dry Bean	Sandy Loam	3.4	7.5	12	22.50	38-77
Springfield, Nebraska	EL057-08HA	Dry Bean	Silt Loam	2.1	7.1	13	19.84	49-85
Taber, Alberta	EL058-08HA	Dry Bean	Loam	2.6	8.3	15	14.37	32-80
Jerome, Idaho	EL059-08HA	Dry Bean	Sandy Loam	2.1	8.1	22	0.71	44-92
Jerome, Idaho	EL059-08HB	Dry Bean	Sandy Loam	2.1	8.2	22	2.89	48-91
Rockwood, Ontario	EL060-08HA	Dry Pea	Sandy Loam	3.4	7.5	12	17.84	38-77
Branchton, Ontario	EL061-08HA	Dry Pea	Loam	1.0	6.2	5.4	21.70	41-80
Parkdale, Oregon	EL062-08HA	Dry Pea	Sandy Loam	6.0	6.0	5.5	4.41	32-83
Minto, Manitoba	EL063-08HA	Dry Pea	Clay Loam	5.0	7.8	28	11.43	34-77
Alvena, Saskatchewan	EL064-08HA	Dry Pea	Clay Loam	3.8	7.9	14	7.74	37-77
Indian Head, Saskatchewan	EL065-08HA	Dry Pea	Clay	4.3	7.8	34	9.50	33-77
Balcarres, Saskatchewan	EL066-08HA	Dry Pea	Sandy Loam	6.7	7.1	25	9.45	33-77

^a Data is for the interval of month of first application through month of last sampling.

Material and methods:

Field trials were conducted as required to determine the magnitude of the penflufen {BYF 14182, (N-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1Hpyrazole-4-carboxamide} residues in/on succulent and dry legumes.

Proposed labeled use pattern (GAP) is provided in Table 6.3.4-1. A total of twenty harvest trials were conducted for this study, including a dry bean trial which provided data for hay and seed matrices only and a dry pea trial which provided data for vines and hay only. Three trials were succulent beans, five trials were succulent peas, five trials were dry beans, and seven trials were dry peas. Two varieties of podded beans, two varieties of podded peas, and one variety of shelled peas were used in the succulent

legume trials. Two varieties of shelled dry beans and three varieties of shelled dry peas were used in the dry legume trials.

The succulent legumes (three bean and five pea trials), edible-podded beans (snap and bush beans) and edible-podded or shelled peas were harvested at a growth stage of BBCH 79 (pods have individual beans easily visible; pods have reached typical size for peas). The dry bean forage (four complete trials plus an additional trial where only hay and seed were harvested) was collected at growth stages ranging from BBCH 36 to BBCH 59 (six visibly extended internodes to pre-bloom); hay was harvested at BBCH 85 to BBCH 89 (pods one-half to fully mature); and seed was harvested at BBCH 89 (fully ripe, seeds are hard). The dried peas vines and hay (seven trials) were harvested at BBCH 69 to BBCH 74 (end of flowering to 40% of pods have reached typical length), and seed was harvested at BBCH 87 to BBCH 89 (70% of pods ripe to fully ripe). Hay and seed were allowed to dry to commercial dryness for 0 to 19 days prior to sampling.

The pre-harvest intervals (PHIs) for harvested legumes, ranged from 49 to 83 days following planting for succulent beans, from 52 to 78 days for succulent peas, from 69 to 118 days for dry beans, and from 89 to 113 days for dry peas. The PHIs for the foliage of legumes ranged from 33 to 60 days for dry bean forage, from 69 to 100 days for dry bean hay, and from 52 to 77 days for dry pea vines and hay.

Findings:

Mean recoveries at the 0.01 mg/kg fortification level for penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, SD \leq 20% as shown in Table 6.3.4-4. All results of the method validation are in accordance with the general requirements for residue analytical methods, therefore the method was validated successfully. The method LOQ for penflufen, Pen-3HB, and Pen-HGT is 0.01 ppm for each analyte in all bean and pea matrices. The calculated method limit of detection (LOD) for penflufen, Pen-3HB, and Pen-HGT in succulent peas were 0.002 ppm, 0.007 ppm, and 0.001 ppm, respectively. The calculated method LOD for penflufen, Pen-3HB and Pen-HGT in succulent beans were 0.001 ppm, 0.007 ppm, and 0.001 ppm, respectively. The calculated method LOD for penflufen, Pen-3HB, and Pen-HGT in dry bean forage and dry pea vines were 0.004 ppm, 0.007 ppm, and 0.003 ppm, respectively. The calculated LOD for penflufen, Pen-3HB, and Pen-HGT in dry bean seed and dry pea seed were 0.003 ppm, 0.009 ppm, and 0.001 ppm, respectively.

Table 6.5.3-1 Summary of recoveries penflufen (BYF 14182), Pen-3HB, and Pen-HGT from succulent bean seed, succulent pea seed, dry bean forage, hay, and seed, and dry pea vines, hay, and seed.

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Table 6.3.4-4 Summary of recoveries penflufen (BYF 14182), Pen-3HB, and Pen-HGT from Legumes

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean Recovery %	Standard Deviation %
Dry Bean Forage	Pen-3HB	0.010	4	94, 91, 104, 104	98%	7
	BYF 14182	0.010	4	91, 85, 94, 100	93%	6
	Pen-HGT	0.010	4	94, 94, 99, 94	95%	2
Dry Bean Hay	Pen-3HB	0.010	4	93, 92, 99, 93	94%	3
	BYF 14182	0.010	4	112, 91, 98, 94	99%	10
	Pen-HGT	0.010	4	88, 86, 98, 88	90%	5
Dry Bean Seed	Pen-3HB	0.010	4	88, 86, 96, 96	91%	5
	BYF 14182	0.010	4	91, 90, 87, 84	88%	3
	Pen-HGT	0.010	4	87, 89, 87, 87	87%	1
Succulent Pea Seed	Pen-3HB	0.010	3	101, 93, 106	100%	6
	BYF 14182	0.010	3	99, 93, 96	96%	3
	Pen-HGT	0.010	3	81, 97, 92	90%	8
Dry Pea Hay	Pen-3HB	0.010	4	86, 89, 97, 88	90%	5
	BYF 14182	0.010	4	98, 91, 100, 91	95%	5
	Pen-HGT	0.010	4	90, 115, 94, 101	100%	11
Dry Pea Seed	Pen-3HB	0.010	4	100, 101, 91, 86	95%	7
	BYF 14182	0.010	4	91, 98, 93, 81	90%	7
	Pen-HGT	0.010	4	85, 101, 97, 85	92%	8
Dry Pea Vines	Pen-3HB	0.010	4	87, 92, 94, 96	92%	4
	BYF 14182	0.010	4	83, 90, 88, 96	89%	5
	Pen-HGT	0.010	4	119, 93, 84, 98	99%	15
Succulent Bean Seed	Pen-3HB	0.010	3	89, 95, 97	93%	4
	BYF 14182	0.010	3	94, 99, 89	94%	5
	Pen-HGT	0.010	3	88, 98, 100	95%	7

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The percent decompositions observed were $\leq 11\%$, $\leq 15\%$, $\leq 5\%$, $\leq 32\%$, $\leq 8\%$, $\leq 5\%$, and $\leq 26\%$, respectively. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.3.3-5.

Table 6.3.3-5 Summary of storage conditions for legumes and legume foliage

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C)^a	Actual Study Duration (days)^b	Limit of Demonstrated Storage Stability (days)^c
BYF 14182, Pen-3HB, and Pen-HGT	Succulent Bean Seed	< 0°C	508	273
BYF 14182, Pen-3HB, and Pen-HGT	Succulent Pea Seed	< 0°C	516	273
BYF 14182, Pen-3HB, and Pen-HGT	Dry Bean Forage	< 0°C	556	264
BYF 14182, Pen-3HB, and Pen-HGT	Dry Bean Hay	< 0°C	492	264
BYF 14182, Pen-3HB, and Pen-HGT	Dry Bean Seed	< 0°C	492	273
BYF 14182, Pen-3HB, and Pen-HGT	Dry Pea Vines	< 0°C	528	264
BYF 14182, Pen-3HB, and Pen-HGT	Dry Pea Hay	< 0°C	528	264
BYF 14182, Pen-3HB, and Pen-HGT	Dry Pea Seed	< 0°C	497	273

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KIIA 6.1.1/02, MIRD No. 48023721.

The treated plot was planted with pea or bean seed treated with Penred 240FS by Bayer CropScience Seed and Technology Center using procedures typical of commercial seed treatment operations. Following treatment, the seeds were planted at seeding rates ranging from 30 to 248 lb seed/A (50,000 to 490,000 seeds/A), resulting in soil application rates of 0.001 to 0.012 lb BYF 14182/A (0.002 to 0.014 kg BYF 14182/ha). A control and a treated plot were used in each trial. In all trials, single control samples and duplicate treated samples of the legume commodities were collected from each plot at normal maturity. Location and detailed use patterns for the trials are provided in Table 6.3.4-6.

Table 6.3.3-6 Study use pattern for PENRED 240FS in/on Legumes

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^a	Timing ^b	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Succulent Bean											
Germansville, Pennsylvania Region 1	EL048-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	None
Gardner, Kansas Region 5	EL049-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.003)	NA	NA	0.002 (0.003)	None
Branchton, Ontario Region 5	EL050-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	None
Succulent Pea											
North Rose, New York Region 1	EL051-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.009 (0.010)	NA	NA	0.009 (0.010)	None
North Rose, New York Region 1	EL052-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.001 (0.002)	NA	NA	0.001 (0.002)	None
Rockwood, Ontario Region 5	EL053-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.004 (0.005)	NA	NA	0.004 (0.005)	None
Conklin, Michigan Region 5	EL054-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	None
Branchton, Ontario Region 5	EL055-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.012 (0.014)	NA	NA	0.012 (0.014)	None
Dry Bean											
Rockwood, Ontario Region 5	EL056-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.006 (0.007)	NA	NA	0.006 (0.007)	None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^a	Timing ^b	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Springfield, Nebraska Region 5	EL057-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.005 (0.006)	NA	NA	0.005 (0.006)	None
Taber, Alberta Region 7A	EL058-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.003 (0.003)	NA	NA	0.003 (0.003)	None
Jerome, Idaho Region 11	EL059-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.004 (0.005)	NA	NA	0.004 (0.005)	None
Jerome, Idaho Region 11	EL059-08HB	2009	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.005 (0.006)	NA	NA	0.005 (0.006)	None
Dry Pea											
Rockwood, Ontario Region 5	EL060-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.005 (0.006)	NA	NA	0.005 (0.006)	None
Branchton, Ontario Region 5	EL061-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.012 (0.013)	NA	NA	0.012 (0.013)	None
Parkdale, Oregon Region 11	EL062-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.003 (0.004)	NA	NA	0.003 (0.004)	None
Minto, Manitoba Region 14	EL063-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.006 (0.006)	NA	NA	0.006 (0.006)	None
Alvena, Saskatchewan Region 14	EL064-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.010 (0.011)	NA	NA	0.010 (0.011)	None
Indian Head, Saskatchewan Region 14	EL065-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.006 (0.006)	NA	NA	0.006 (0.006)	None
Balcarres, Saskatchewan Region 14	EL066-08HA	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.006 (0.007)	NA	NA	0.006 (0.007)	None

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homoglutathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards (Method EL-002-P09-01). Residues of penflufen and its metabolites are summarized in Table 6.3.4-7. Individual residues of penfluflen and its metabolites Pen-3HB and Pen-HGT were less than the LOQ (<0.01 ppm) in all of the succulent and dry pea and bean matrices.

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Table 6.3.4-7 Residue Data from the Legume trials with Penflufen.

Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Succulent Bean													
Germansville, Pennsylvania	EL048-08HA	Succulent Bean	2008	1	TRTD	Eureka (PVP)	Succulent Seed (with pod)	NA	0.002 (0.002)	50	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Gardner, Kansas	EL049-08HA	Succulent Bean	2008	5	TRTD	Eureka PVP	Succulent Seed (with pod)	NA	0.002 (0.003)	49	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Branchton, Ontario	EL050-08HA	Succulent Bean	2008	5	TRTD	Sea Biscuit	Succulent Seed (with pod)	NA	0.002 (0.002)	83	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Succulent Pea													
North Rose, New York	EL051-08HA	Succulent Pea	2008	1	TRTD	Knight	Succulent Seed (without pod)	NA	0.009 (0.010)	63	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
North Rose, New York	EL052-08HA	Succulent Pea	2008	1	TRTD	Oregon Sugar Pod II	Succulent Seed (with pod)	NA	0.001 (0.002)	78	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Rockwood, Ontario	EL053-08HA	Succulent Pea	2008	5	TRTD	Knight	Succulent Seed (without pod)	NA	0.004 (0.005)	59	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Conklin, Michigan	EL054-08HA	Succulent Pea	2008	5	TRTD	Sugar Ann	Succulent Seed (with pod)	NA	0.002 (0.002)	52	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Branchton, Ontario	EL055-08HA	Succulent Pea	2008	5	TRTD	Oregon Sugar Pod II	Succulent Seed (with pod)	NA	0.012 (0.014)	60	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Dry Bean Forage													
Rockwood, Ontario	EL056-08HA	Dry Bean	2008	5	TRTD	Othello	Forage	17	0.006 (0.007)	34	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, Nebraska	EL057-08HA	Dry Bean	2008	5	TRTD	Othello	Forage	14	0.005 (0.006)	37	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Taber, Alberta	EL058-08HA	Dry Bean	2008	7A	TRTD	Great White Northern	Forage	15	0.003 (0.003)	60	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Jerome, Idaho	EL059-08HB	Dry Bean	2009	11	TRTD	1140 Great- Northern	Forage	13	0.005 (0.006)	33	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Dry Bean Hay													
Rockwood, Ontario	EL056-08HA	Dry Bean	2008	5	TRTD	Othello	Hay	80	0.006 (0.007)	84	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, Nebraska	EL057-08HA	Dry Bean	2008	5	TRTD	Othello	Hay	80	0.005 (0.006)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Taber, Alberta	EL058-08HA	Dry Bean	2008	7A	TRTD	Great White Northern	Hay	48	0.003 (0.003)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Jerome, Idaho	EL059-08HA	Dry Bean	2008	11	TRTD	1140 Great-Northern	Hay	87	0.004 (0.005)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Jerome, Idaho	EL059-08HB	Dry Bean	2009	11	TRTD	1140 Great-Northern	Hay	86	0.005 (0.006)	88	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Dry Bean Seed													
Rockwood, Ontario	EL056-08HA	Dry Bean	2008	5	TRTD	Othello	Seed	81	0.006 (0.007)	118	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, Nebraska	EL057-08HA	Dry Bean	2008	5	TRTD	Othello	Seed	81	0.005 (0.006)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Taber, Alberta	EL058-08HA	Dry Bean	2008	7A	TRTD	Great White Northern	Seed	57	0.003 (0.003)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Jerome, Idaho	EL059-08HA	Dry Bean	2008	11	TRTD	1140 Great-Northern	Seed	89	0.004 (0.005)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Jerome, Idaho	EL059-08HB	Dry Bean	2009	11	TRTD	1140 Great-Northern	Seed	90	0.005 (0.006)	88	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Dry Pea Vines													
Rockwood, Ontario	EL060-08HA	Dry Pea	2008	5	TRTD	Eclipse	Vines	22	0.005 (0.006)	77	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Branchton, Ontario	EL061-08HA	Dry Pea	2008	5	TRTD	Eclipse	Vines	31	0.012 (0.013)	77	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Parkdale, Oregon	EL062-08HA	Dry Pea	2008	11	TRTD	Columbian	Vines	21	0.003 (0.004)	56	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Minto, Manitoba	EL063-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Vines	21	0.006 (0.006)	56	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Alvena, Saskatchewan	EL064-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Vines	21	0.010 (0.011)	52	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, Saskatchewan	EL065-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Vines	18	0.006 (0.006)	58	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Balcarres, Saskatchewan	EL066-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Vines	21	0.006 (0.007)	72	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Dry Pea Hay													
Rockwood, Ontario	EL060-08HA	Dry Pea	2008	5	TRTD	Eclipse	Hay	65	0.005 (0.006)	77	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Branchton, Ontario	EL061-08HA	Dry Pea	2008	5	TRTD	Eclipse	Hay	81	0.012 (0.013)	77	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Parkdale, Oregon	EL062-08HA	Dry Pea	2008	11	TRTD	Columbian	Hay	42	0.003 (0.004)	56	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Minto, Manitoba	EL063-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Hay	78	0.006 (0.006)	56	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Alvena, Saskatchewan	EL064-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Hay	79	0.010 (0.011)	52	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, Saskatchewan	EL065-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Hay	74	0.006 (0.006)	58	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Balcarres, Saskatchewan	EL066-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Hay	66	0.006 (0.007)	72	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Dry Pea Seed													
Rockwood, Ontario	EL060-08HA	Dry Pea	2008	5	TRTD	Eclipse	Seed	81	0.005 (0.006)	95	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Parkdale, Oregon	EL062-08HA	Dry Pea	2008	11	TRTD	Columbian	Seed	83	0.003 (0.004)	113	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Minto, Manitoba	EL063-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Seed	84	0.006 (0.006)	102	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Alvena, Saskatchewan	EL064-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Seed	84	0.010 (0.011)	94	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, Saskatchewan	EL065-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Seed	69	0.006 (0.006)	89	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State/Province)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	PHI (Days) ^c	Residue (ppm)		
											BYF 14182	Pen-3HB	Pen-HGT
Balcarres, Saskatchewan	EL066-08HA	Dry Pea	2008	14	TRTD	CDC Golden	Seed	79	0.006 (0.007)	104	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

^a Due to generic matrix descriptions in the electronic notebooks used for the collection of field data (FieldNotes™), dry bean forage, dry bean hay and dry bean seed may be referred to as cowpea forage, cowpea hay, and cowpea seed, respectively. In addition, succulent pea may be referred to as ‘succulent seed with pod’, however the sample may or may not include the pod. Succulent bean may be specified as ‘snap bean’, however another succulent variety may have been used.

^b Legume seeds (succulent bean, succulent pea, dry bean, and dry pea) treated with BYF 14182 FS240 (red) at a rate of 5 g of BYF 14182/100 kg seed were planted at seeding rates ranging from 30 to 248 lb ai/A (50,000 to 490,000 seeds/A), resulting in soil application rates of 0.001 to 0.012 lb BYF 14182/A (0.002 to 0.014 kg BYF 14182/ha).

^c PHI = Pre-harvest interval, the interval between planting of the treated seed and harvest of the RAC commodity.

Conclusion

PENRED 240FS was applied to legume seed at a rate of 5 g penflufen/100 kg seed. Following treatment, the seeds were planted at seeding rates ranging from 30 to 248 lb seed/A (50,000 to 490,000 seeds/A), resulting in soil application rates of 0.001 to 0.012 lb BYF 14182/A (0.002 to 0.014 kg BYF 14182/ha). In all trials, single control samples and duplicate treated samples were collected from each plot at earliest commercial harvest (ECH) for each commodity.

The residues of penflufen (BYF 14182) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homogluthathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labelled internal standards.

Individual residues of penflufen, Pen-3HB and Pen-HGT were less than the LOQ (<0.01 ppm) in all of succulent and dry pea, succulent and dry bean and the foliage of pea and bean (dry bean forage, dry bean hay, dry pea vines, and dry pea hay).

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.6.1.5 Magnitude of the Residue in Soybean

Report:	KIIA 6.3.5/01; Milo, J., Ardiel, K.; 2010; M-364873-01-2
Title:	BYF 14182 FS240 Red – Magnitude of Residues In/On Soybean (1X)
Report No.	RAELP052
Document No.:	M-364873-01-2
	MRID No. 48023728
	PMRA No. 1885938
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1500, Crop Field Trials
	PMRA Residue Chemistry Guidelines DIR98-02: Section 9 Crop Field Trials
GLP	Yes (certified laboratory); Deviations: None
Acceptability	Study is scientifically acceptable

Executive Summary

Field trials were conducted at seven locations to measure the magnitude of penflufen {BYF 14182, (*N*-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1*H*pyrazole-4-carboxamide} residues in soybean seed, forage and hay following the planting of seeds treated with penflufen at a rate of 5 g active ingredient (ai)/100 kg seed.

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homoglutathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labelled internal standards. The method limit of quantitation (LOQ) for penflufen, Pen-3HB, and Pen-HGT was 0.01 ppm for all analytes in all soybean matrices.

Individual residues of BYF 1412 (penflufen) and its metabolites, Pen-3HB and Pen-HGT, were less than the LOQ (<0.01 ppm) in soybean seed, forage and hay.

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Proposed Use Pattern

Penflufen (BYF 14182) is to be registered in USA and Canada for use as a seed treatment in soybeans. The treatment rate in North America is summarized in Table 6.3.5-1.

Table 6.3.5-1 Use patterns for the spray application of BYF 14182 in/on soybeans in North America

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Soybeans	North America	Seed Treatment	1	5	NA	NA	NA

To support the representative use, a total of seven residue trials in/on soybeans were conducted with seed treated with the formulation PENRED 240FS (BYF 14182 FS240 Red) during the 2008 growing season (Table 6.3.5-2).

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Table 6.3.5-2 Location of Soybean trials

Type of formulation	Crop	NAFTA Region	Soybean Trials			Report No.	Dossier ref.:
			Submitted	Requested ^a			
				Canada	US		
240FS*	Soybean	2	1		1	RAELP052	KIIA 6.3.5/01
		4	1		1		
		5	5	2	3		
		Total	7	2	5		

*240FS: flowable concentrate containing 240 g/L of BYF 14182 (Penflufen)

^a The total number of required NAFTA field trials was reduced based on findings in the metabolism and TRR studies during discussions with US EPA (Chem SAC minutes 12/12/2007) and PMRA (PMRA, memorandum Feb. 21, 2008).

Trial site conditions, including soil characteristics are summarized in Table 6.3.5-3.

Table 6.3.5-3 Trial site conditions for PENRED 240FS in/on Soybeans

Location (City, State/Prov)	Study No. – Site No.	Soil Characteristics					Meteorological Data	
		Soil Type	% Organic Matter	Soil pH	CEC	%Sand Silt Clay	Total Rainfall (mm)	Temp. Range (°C)
Seven Springs, NC	RAELP052- 01-08H	Loamy sand	0.7	6.4	6.5	82 12 6	777	2.8 - 32
Fisk, MO	RAELP052- 02-08H	Silt Loam	1.5	6.7	5.8	68 18 14	519	12 - 33
Rockwood, ON	RAELP052- 03-08H	Sandy Loam	3.4	7.5	12.4	49.6 42.8 7.6	571.3	3.4 - 25
Breslau, ON	RAELP052- 04-08H	Sandy Loam	3.2	7.8	15.3	53.6 38.8 7.6	544	3.7 - 26
Carlyle, IL	RAELP052- 05-08H	Silt Loam	2.4	6.14	11.89	11.6 76.16 12.24	749.3	2.3 - 36
Campbell, MN	RAELP052- 06-08H	Clay Loam	6.5	6	25.6	25 36 39	729	6.0 - 28
Springfield, NE	RAELP052- 07-08H	Silt Loam	2.1	7.1	12.7	16 62 22	782.3	-3.3 - 35

Material and methods:

Field trials were conducted as required to determine the magnitude of the penflufen {BYF 14182, (*N*-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1*H*pyrazole-4-carboxamide} residues in/on soybeans.

Proposed labeled use pattern (GAP) is provided in Table 6.3.5-1. A total of seven harvest trials were conducted for this study. Forage samples were collected at a target crop growth stage of BBCH 45 to 51 (development of harvest vegetative plant parts to first flower buds just visible), 34 to 58 days after planting. Hay samples were collected at a target crop growth stage of BBCH 69 to 73 (first pods visible to approximately 30% of pods have reached final length). The hay was cut 60 to 83 days after planting. Seed samples were collected at BBCH 87 to 89 (70% ripened pods to full maturity), 110 to 163 days after planting.

Findings:

Individual recoveries at the 0.01 mg/kg, 0.05 mg/kg and 0.20 mg/kg fortification levels for penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, SD \leq 20% as shown in Table 6.3.5-4. All results of the method validation are in accordance with the general requirements for residue analytical methods, therefore the method was validated successfully. The method LOQ for penflufen, Pen-3HB, and Pen-HGT was 0.01 ppm for each analyte in all soybean matrices. The calculated method limit of detection (LOD) for penflufen, Pen-3HB, and Pen-HGT in soybean forage were 0.004 ppm, 0.003 ppm, and 0.007 ppm, respectively. The calculated LOD for penflufen, Pen-3HB, and Pen-HGT in soybean hay were 0.004 ppm, 0.002 ppm, and 0.009 ppm, respectively. The calculated method LOD for penflufen, Pen-3HB, and Pen-HGT in soybean seed were 0.002 ppm, 0.001 ppm, and 0.009 ppm, respectively.

Table 6.3.5-4 Summary of recoveries penflufen (BYF 14182), Pen-3HB, and Pen-HGT from Soybean seed, forage and hay

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Stan. % Dev.
Forage	Pen-3HB	0.010	1	104	NA	NA
		0.050	1	93		
		0.200	1	101		
	Penflufen	0.010	1	76		
		0.050	1	84		
		0.200	1	95		
	Pen-HGT	0.010	1	71		
		0.050	1	71		
		0.200	1	95		
Hay	Pen-3HB	0.010	1	96		
		0.050	1	99		
		0.200	1	95		
	Penflufen	0.010	1	109		
		0.050	1	94		
		0.200	1	99		
	Pen-HGT	0.010	1	88		
		0.050	1	83		
		0.200	1	86		
Seed	Pen-3HB	0.010	1	92		
		0.050	1	98		
		0.200	1	96		
	Penflufen	0.010	1	73		
		0.050	1	98		
		0.200	1	98		
	Pen-HGT	0.010	1	86		
		0.050	1	76		
		0.200	1	89		

NA is Not Applicable.

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.3.5-5

Table 6.3.5-5 Summary of storage conditions for Soybean Seed, Forage and Hay

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C) ^a	Actual Study Duration (days) ^b	Limit of Demonstrated Storage Stability (days)
Penflufen, Pen-3HB, and Pen-HGT	soybean forage	< 0 °C	476	270
Penflufen, Pen-3HB, and Pen-HGT	soybean hay	< 0 °C	453	264
Penflufen, Pen-3HB, and Pen-HGT	soybean seed	< 0 °C	401	269

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From the KIIA 6.1.1/02, MRID No. 48023721.

The treated plot was planted with soybean seed treated with PENRED 240FS by Bayer CropScience Seed and Technology Center using procedures typical of commercial seed treatment operations. Following treatment, the seeds were planted at seeding rates ranging from 41 to 131 lb seed/A resulting in soil application rates of 0.002 to 0.007 lb penflufen/A (0.002 to 0.07 kg penflufen/ha). A control and a treated plot were used in each trial. In all trials, single control samples and duplicate treated samples of the soybean commodities were collected from each plot at normal maturity. Location and detailed use patterns for the trials are provided in Table 6.3.5-6.

Table 6.3.5-6 Study use pattern for PENRED 240FS in/on Soybeans

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^a	Timing ^b	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Seven Springs, NC Region 2	01-08H	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.002 (0.002)	NA	NA	0.002 (0.002)	None
Fisk, MO Region 4	02-08H	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.003 (0.003)	NA	NA	0.003 (0.003)	None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^a	Timing ^b	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Rockwood, ON Region 5	03-08H	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.007 (0.007)	NA	NA	0.007 (0.007)	None
Breslau, ON Region 5	04-08H	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.007 (0.007)	NA	NA	0.007 (0.007)	None
Carlyle, IL Region 5	05-08H	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.003 (0.003)	NA	NA	0.003 (0.003)	None
Campbell, MN Region 5	06-08H	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.003 (0.003)	NA	NA	0.003 (0.003)	None
Springfield, NE Region 5	07-08H	2008	BYF 14182 FS240 (red)	Seed Treatment	NA	TRTD	0.003 (0.003)	NA	NA	0.003 (0.003)	None

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homogluthione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards (Method EL-002-P09-01). Residues of penflufen and its metabolites are shown in Table 6.3.5-7. Individual residues of penflufen, Pen-HGT and Pen-3HB were less than the LOQ (<0.01 ppm) in all of the soybean matrices.

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Table 6.3.5-7 Residue Data from Soybeans trials.

Location (City, Province)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	% Dry Matter	kg ai/ha (Lb ai/A) Total Rate	PHI ^a	Penflufen-HGT	Penflufen-3HB	Penflufen
Soybean Forage												
Seven Springs, NC	01-08H	Soybean	2008	2	TRTD1	STINE 5020-4	25.65	0.0023 (0.002)	58	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Fisk, MO	02-08H	Soybean	2008	4	TRTD1	STINE 5020-4	22.52	0.0032 (0.0029)	48	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	03-08H	Soybean	2008	5	TRTD1	STINE 0066-4	48.26	0.0074 (0.0065)	43	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.010.	<0.01 <0.01 Average <0.01
Breslau, ON	04-08H	Soybean	2008	5	TRTD1	STINE 0066-4	17.28	0.0074 (0.0065)	43	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Carlyle, IL	05-08H	Soybean	2008	5	TRTD1	STINE 3128-4	19.21	0.0031 (0.0027)	46	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, Province)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	% Dry Matter	kg ai/ha (Lb ai/A) Total Rate	PHI ^a	Penflufen-HGT	Penflufen-3HB	Penflufen
Campbell, MN	06-08H	Soybean	2008	5	TRTD1	STINE 0306-4	17.37	0.0032 (0.0028)	34	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, NE	07-08H	Soybean	2008	5	TRTD1	STINE 3128-4	16.87	0.0030 (0.0027)	46	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Soybean Hay												
Seven Springs, NC	01-08H	Soybean	2008	2	TRTD1	STINE 5020-4	61.43	0.0023 (0.002)	77	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Fisk, MO	02-08H	Soybean	2008	4	TRTD1	STINE 5020-4	82.17	0.0032 (0.0029)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	03-08H	Soybean	2008	5	TRTD1	STINE 0066-4	48.16	0.0074 (0.0065)	75	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Breslau, ON	04-08H	Soybean	2008	5	TRTD1	STINE 0066-4	72.24	0.0074 (0.0065)	75	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, Province)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	% Dry Matter	kg ai/ha (Lb ai/A) Total Rate	PHI ^a	Penflufen-HGT	Penflufen-3HB	Penflufen
Carlyle, IL	05-08H	Soybean	2008	5	TRTD1	STINE 3128-4	57.81	0.0031 (0.0027)	70	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Campbell, MN	06-08H	Soybean	2008	5	TRTD1	STINE 0306-4	72.51	0.0032 (0.0028)	60	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, NE	07-08H	Soybean	2008	5	TRTD1	STINE 3128-4	62.99	0.0030 (0.0027)	83	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Soybean												
Seven Springs, NC	01-08H	Soybean	2008	2	TRTD1	STINE 5020-4	84.22	0.0023 (0.002)	163	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Fisk, MO	02-08H	Soybean	2008	4	TRTD1	STINE 5020-4	88.28	0.0032 (0.0029)	144	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	03-08H	Soybean	2008	5	TRTD1	STINE 0066-4	88.86	0.0074 (0.0065)	118	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, Province)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	% Dry Matter	kg ai/ha (Lb ai/A) Total Rate	PHI ^a	Penflufen-HGT	Penflufen-3HB	Penflufen
Breslau, ON	04-08H	Soybean	2008	5	TRTD1	STINE 0066-4	81.85	0.0074 (0.0065)	124	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Carlyle, IL	05-08H	Soybean	2008	5	TRTD1	STINE 3128-4	90.01	0.0031 (0.0027)	139	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Campbell, MN	06-08H	Soybean	2008	5	TRTD1	STINE 0306-4	89.28	0.0032 (0.0028)	110	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, NE	07-08H	Soybean	2008	5	TRTD1	STINE 3128-4	88.58	0.0030 (0.0027)	131	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

^a Pre-harvest interval, the interval between planting of the treated seed and harvest/cutting of the RAC commodity.

Conclusion

PENRED 240FS was applied to soybean seed at 5 g penflufen/100 kg seed. Following treatment, the seeds were planted at seeding rates ranging from 41 to 131 lb seed/A resulting in soil application rates of 0.002 to 0.007 lb penflufen/A (0.002 to 0.07 kg penflufen/ha). In all trials, single control samples and duplicate treated samples were collected from each plot at earliest commercial harvest (ECH) for each commodity

The residues of penflufen (BYF 14182) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB) and BYF 14182 homoglutathione (Pen-HGT) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labelled internal standards. Individual residues of penflufen, Pen-3HB and Pen-HGT were less than the LOQ (<0.01 ppm) in all of the soybean matrices.

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.6.1.6 Magnitude of the Residue in Potatoes

Report:	KIIA 6.3.6/01; Fischer, D.F., Helfrich, K.K.; 2010; M-364630-01-1
Title:	BYF 14182 FS240 – Magnitude of the Residue in/on Potatoes
Report No.	RAELP047
Document No.:	M-364630-01-1
	MRID No. 48023729
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1500, Crop Field Trials PMRA Residue Chemistry Guidelines DIR98-02: Section 9 Crop Field Trials
GLP	Yes (certified laboratory); Deviations: None
Acceptability	This study is scientifically acceptable.

Executive Summary

Twenty-six field trials (23 harvest and 3 decline) were conducted to measure the magnitude of penflufen residues in/on potatoes after two different treatment regimes: treatment of potato seed pieces at a target rate of 2 g active ingredient (ai)/100 kg seed piece, and treatment of potato seed

pieces at a target rate of 2 g ai/100 kg seed piece followed by an in-furrow treatment of penflufen after planting for a maximum treatment of 170 g ai/ha (0.153 lb ai/A).

The residues of penflufen (BYF 14182) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB), BYF 14182 homogluthathione (Pen-HGT), BYF 14182 pyrazole-4-carboxamide (Pen-PCX), and BYF 14182-bis-desmethyl-3-carboxylic acid (Pen-D3C) residue were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards. The method limit of quantitation (LOQ) for penflufen, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C was 0.01 ppm for all analytes in potato tubers.

Individual residues of penflufen (BYF 14182) and its metabolites, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C, were less than the LOQ (<0.01 ppm) in all of the potato tubers grown from treated seeds. Individual residues of penflufen (BYF 14182) and its metabolites Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C were less than the LOQ (<0.01 ppm) in all of the potato trials where treated seed pieces were planted and an in-furrow application was made.

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in potato matrices for up to 9 months and may be stable for longer periods of time. Additional storage stability data reflecting longer durations of frozen storage are underway but have not yet been submitted to regulatory authorities. Provided the additional storage stability data demonstrates that residues of penflufen and its metabolites, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C are stable in potato matrices for up to 20 months, this study is considered scientifically acceptable.

Proposed Use Pattern

Penflufen (BYF 14182) is to be registered in USA and Canada for use as a seed treatment on potatoes and/or as an in-furrow application at planting to potatoes. The treatment rates in North America are summarized in Table 6.3.6-1.

Table 6.3.6-1 Use patterns for the spray application of BYF 14182 in/on potatoes in North America

Crop	Location	Type of appl.	No of appl.	Use rate	Water volume min-max	Spray Interval (days)	PHI (days)
Potatoes	North America	Seed Treatment	1	2 g as/100 kg seed	NA	NA	NA
Potatoes	North America	Broadcast In-Furrow	1	0.143 lb as/ A (160 g as /ha) ^a	5 – 20 gal/A	NA	NA

^a Maximum annual application in a season from any source.

Potato Field Trials

Twenty-six field trials (23 harvest and 3 decline) were conducted to measure the magnitude of penflufen (BYF 14182, {N-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide}) residues in/on potatoes after two different treatment regimes: treatment of potato seed pieces with BYF 14182 FS240 (red; also referred to as PENRED 240FS) at a target rate of 2 g ai/100 kg seed piece (TRTDS plot), and treatment of potato seed pieces at a target rate of 2 g ai/100 kg seed piece followed by an in-furrow treatment of BYF 14182 240FS after

planting for a maximum treatment of 160 g ai/ha (0.143 lb ai/A) (TRTDF plot). This formulation is a flowable concentrate containing 240 g penflufen/L.

Table 6.3.6-2 Location of Potato trials

Type of formulation	Crop	NAFTA Growing Region	Potato			Report No.	Dossier ref.:
			Submitted	Requested			
				Canada	US		
240FS	Potato	1	7	5	2	RAELP047	KIIA 6.3.6/01
		2	1		1		
		3	1		1		
		5	5	1	4		
		7A	1	1			
		8					
		9 ^a	1		1		
		10	1		1		
		11	6		6		
		12	1	1			
		14	2	2			
		Total	26	10	16		

¹ 240FS is a flowable concentrate containing 240 g/L of BYF 14182

^a This trial was actually conducted in Region 8, 14 miles east of the border with Region 9.

Trial site conditions, including soil characteristics are summarized in Table 6.3.6-3.

Table 6.3.6-3 Trial site conditions for PENRED 240FS in/on Potatoes

Study Location (City, State)	Trial Number	Year	Soil Characteristics ^a				Meteorological Data ^b	
			Type	% OM	pH	CEC	Total Rainfall (in)	Temp. Range (°F)
Germansville, PA	EL008-08DA	2008	Clay Loam	2.2	7	9.5	12.17	42-92
Baptistown, NJ	EL009-08HA	2008	Loam	1.5	6.6	8.2	24.23	38-84
North Rose, NY	EL010-08HA	2008	Silt Loam	3.9	5.4	8.3	17.71	39-84
North Rose, NY	EL011-08HA	2008	Sandy Loam	3.4	7.4	10.6	12.14	52-84
North Rose, NY	EL012-08HA	2008	Sandy Loam	7.6	5.6	12.8	12.10	42-79
Hunter River, Atlantic, Canada	EL013-08HA	2008	Sandy Loam	2.1	6.2	8.2	22.28	39-74
Hunter River, Atlantic, Canada	EL014-08HA	2008	Sandy Loam	2.1	6.2	8.2	22.28	39-74
Seven Springs, NC	EL015-08HA	2008	Loamy Sand	0.7	6.4	6.5	6.11	49-90
Oviedo, FL	EL016-08HA	2008	Sand	0.6	6.9	2.5	11.89	53-88
Rockwood, Ontario, Canada	EL017-08HA	2008	Sandy Loam	3.4	7.5	12.4	17.84	38-77
Arkansas, WI	EL018-08HA	2008	Sandy Loam	2	6.7	5	17.80	34-83

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Study Location (City, State)	Trial Number	Year	Soil Characteristics ^a				Meteorological Data ^b	
			Type	% OM	pH	CEC	Total Rainfall (in)	Temp. Range (°F)
Richland, IA	EL019-08HA	2008	Silt Loam	3.9	6.66	21.4	27.68	49-83
Clarence, MO	EL020-08HA	2008	Silty Clay Loam	2.0	6.4	19.1	41.80	54-85
Gardner, KS	EL021-08HA	2008	Silt Loam	1.8	5.8	16.8	25.52	40-88
Taber, Alberta, Canada	EL022-08HA	2008	Loam	2.56	8.33	15.43	14.33	32-80
Eaton, CO	EL023-08HA	2008	Sandy Loam	1.7	7.5	37	14.18	31-96
Fresno, CA	EL024-08HA	2008	Sandy Loam	0.8	7.6	10.7	0.67	42-96
Jerome, ID	EL025-08HA	2008	Fine Sandy Loam	2.1	8.1	21.8	2.18	36-92
Rupert, ID	EL026-08HA	2008	Loam	1.4	7.9	19	0.70	39-88
Ephrata, WA	EL027-08HA	2008	Sandy Loam	1.3	7.4	12.6	0.43	31-87
Hermiston, OR	EL028-08HA	2008	Loamy Sand	0.8	5.8	12.4	1.22	49-89
Payette, ID	EL029-08HA	2008	Loam	1.97	8.1	14	2.23	43-95
Ephrata, WA	EL030-08DA	2008	Sandy Loam	1.3	7.4	12.6	0.43	31-87
Abbotsford, British Columbia, Canada	EL031-08HA	2008	Silt Loam	5.8	7	13.8	14.09	41-75
Minto, Manitoba, Canada	EL032-08DA	2008	Clay loam	4.988	7.8	28.5	11.43	34-77
Wellwood, Manitoba, Canada	EL033-08HB	2008	Clay Loam	12.384	6.6	20.0	18.90	42-78

^a Abbreviations are as follows % OM = Percent Organic Matter, CEC = Cation Exchange Capacity in meq/100 g soil.

^b Data is for the interval of month of first application through month of last sampling.

Material and methods:

Field trials were conducted as required to determine the magnitude of the penflufen {BYF 14182, (*N*-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1*H*pyrazole-4-carboxamide} residues in/on potatoes. As per the proposed labeled use pattern (GAP) as shown in Table 6.3.5-1, treated seed potatoes were planted into the TRTDS and TRTDF plots at seeding rates ranging from 2245 to 4000 kg seed pieces/ha (except for trial EL024-08HA in which the seeding rates were 770 and 697 kg seed pieces/ha for the TRTDS and TRTDF plots, respectively) which resulted in soil loading rates ranging from 45 to 80 g BYF 14182/ha (0.040 to 0.071 lb BYF 14182/A; except for trial EL024-08HA which had a soil loading rate of 14 g BYF 14182/ha). Following planting, the seed potatoes in the TRTDF plots received an in-furrow application with BYF 14182 240FS at rates ranging from 78 to 117 g BYF 14182/ha (0.070 to 0.104 lb BYF 14182/A) that resulted in a combined total application rate ranging from 154 to 171 g BYF 14182/ha (0.137 to 0.153 lb BYF 14182/A; except for trial EL024-08HA which had a combined total application rate of 95 g BYF 14182/ha).

Potato tubers were dug at earliest commercial harvest (ECH; BBCH 48 to BBCH 49: maximum of total tuber mass reached to skin set complete). The potato tubers were allowed to dry according to normal practice before sampling. Duplicate composite samples (two separate runs through the plot) were collected from each treated plot and a single composite sample was collected from each control plot. Additional samples were collected from the decline trial treated plots 10 and 5 days before ECH and 5 and 10 days after ECH.

Findings:

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB), BYF 14182 homogluthione (Pen-HGT), BYF 14182 pyrazole-4-carboxamide (Pen-PCX), and BYF 14182-bis-desmethyl-3-carboxylic acid (Pen-D3C) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labelled internal standards (Method EL-002-P09-01).

Mean recoveries at the 0.01 mg/kg and 0.10 mg/kg fortification levels for penflufen and its metabolites Pen-3HB (BYF 14182 3-hydroxy butyl, BCS-AA10006), Pen-HGT (BYF 14182 homogluthione, BCS-AA10790), Pen-PCX (BYF 14182-pyrazole-4-carboxamide, BCS-AA10791), and Pen-D3C (BYF 14182-bis-desmethyl-3-carboxylic acid, BCS-CM41431) were within the acceptable range of 70-110%, SD \leq 20% as shown in Table 6.3.6-4. All results of the method validation are in accordance with the general requirements for residue analytical methods, therefore the method was validated successfully. The method LOQ for penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C was 0.01 ppm for each analyte in potato tubers. The calculated limit of detection (LOD) for penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C were 0.003 ppm, 0.002 ppm, 0.002 ppm, 0.003 ppm and 0.002 ppm, respectively.

Table 6.3.6-4 Summary of Recoveries of BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C from Potatoes

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean Recovery %	Standard Deviation %
Potato Tubers	BYF 14182	0.01	8	105, 92, 90, 87, 102, 95, 99, 82	94	8
		0.10	12	72, 99, 89, 88, 81, 94, 92, 80, 95, 80, 85, 104	88	9
	Pen-3HB	0.01	8	94, 88, 93, 93, 90, 93, 86, 83	90	4
		0.10	12	83, 88, 91, 91, 83, 83, 87, 85, 90, 84, 96, 103	89	6
	Pen-HGT	0.01	8	83, 86, 92, 85, 90, 86, 79, 78	85	5
		0.10	12	78, 91, 92, 89, 80, 84, 74, 94, 82, 87, 99, 89	87	7
	Pen-PCX	0.01	8	105, 107, 83, 118, 95, 100, 110, 94	101	11
		0.10	12	80, 98, 92, 93, 73, 95, 92, 88, 76, 92, 94, 91	89	8
	Pen-D3C	0.01	8	82, 86, 79, 70, 91, 94, 82, 77	83	8
		0.10	12	73, 93, 98, 73, 71, 70, 76, 82, 84, 84, 84, 78	81	9

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C are stable in potato tubers stored frozen for up to 9 months. The continuation of this study will provide storage stability data for up to 24 months.

The storage periods for samples in the potato field trials are listed in Table 6.3.6-5.

Table 6.3.6-5 Summary of Storage Conditions for BYF 14182 in Potato Tubers

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C) ^a	Actual Study Duration (days) ^b	Limit of Demonstrated Storage Stability (days) ^c
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Potato Tubers	< 0°C	579	273

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KHA 6.1.1/02, MRID No. 48023721.

Location and detailed use patterns for the trials are provided in Table 6.3.6-6 for TRTDS plots and Table 6.3.6-7 for TRTDF plots.

Table 6.3.6-6 Study use pattern for PENRED 240FS in/on Potatoes, Plot TRTDS (Seed Treatment Only)

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Method	Timing ^a	Application					Tank Mix Adjuvants
						Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Germansville, PA Region 1	EL008-08DA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.054 (0.060)	NA ^b	NA ^b	0.054 (0.060)	None
Baptistown, NJ Region 1	EL009-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.054 (0.060)	NA ^b	NA ^b	0.054 (0.060)	None
North Rose, NY Region 1	EL010-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.040 (0.045)	NA ^b	NA ^b	0.040 (0.045)	None
North Rose, NY Region 1	EL011-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.040 (0.045)	NA ^b	NA ^b	0.040 (0.045)	None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Method	Timing ^a	Application					Tank Mix Adjuvants
						Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
North Rose, NY Region 1	EL012-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.054 (0.061)	NA ^b	NA ^b	0.054 (0.061)	None
Hunter River, Atlantic, Canada, Region 1	EL013-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.045 (0.050)	NA ^b	NA ^b	0.045 (0.050)	None
Hunter River, Atlantic, Canada, Region 1	EL014-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.046 (0.051)	NA ^b	NA ^b	0.046 (0.051)	None
Seven Springs, NC Region 2	EL015-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.069 (0.077)	NA ^b	NA ^b	0.069 (0.077)	None
Oviedo, FL Region 3	EL016-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.055 (0.062)	NA ^b	NA ^b	0.055 (0.062)	None
Rockwood, ON Canada Region 5	EL017-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.046 (0.051)	NA ^b	NA ^b	0.046 (0.051)	None
Arkansaw, WI Region 5	EL018-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.070 (0.078)	NA ^b	NA ^b	0.070 (0.078)	None
Richland, IA Region 5	EL019-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.045 (0.050)	NA ^b	NA ^b	0.045 (0.050)	None
Clarence, MO Region 5	EL020-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.048 (0.054)	NA ^b	NA ^b	0.048 (0.054)	None
Gardner, KS Region 5	EL021-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.070 (0.079)	NA ^b	NA ^b	0.070 (0.079)	None
Taber, Alberta Canada Region 7A	EL022-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.045 (0.050)	NA ^b	NA ^b	0.045 (0.050)	None
Eaton, CO Region 8	EL023-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.071 (0.080)	NA ^b	NA ^b	0.071 (0.080)	None
Fresno, CA Region 10	EL024-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.013 (0.015)	NA ^b	NA ^b	0.013 (0.015)	None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Method	Timing ^a	Application					Tank Mix Adjuvants
						Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Jerome, ID Region 11	EL025-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.043 (0.048)	NA ^b	NA ^b	0.043 (0.048)	None
Rupert, ID Region 11	EL026-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.066 (0.074)	NA ^b	NA ^b	0.043 (0.074)	None
Ephrata, WA Region 11	EL027-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.040 (0.045)	NA ^b	NA ^b	0.040 (0.045)	None
Hermiston, OR Region 11	EL028-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.071 (0.079)	NA ^b	NA ^b	0.071 (0.079)	None
Payette, ID Region 11	EL029-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.047 (0.053)	NA ^b	NA ^b	0.047 (0.053)	None
Ephrata, WA Region 11	EL030-08DA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.040 (0.045)	NA ^b	NA ^b	0.040 (0.045)	None
Abbotsford, BC Canada Region 12	EL031-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.045 (0.050)	NA ^b	NA ^b	0.045 (0.050)	None
Minto, MB Canada Region 14	EL032-08DA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.045 (0.050)	NA ^b	NA ^b	0.045 (0.050)	None
Wellwood, MB Canada Region 14	EL033-08HB	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDS	0.045 (0.050)	NA ^b	NA ^b	0.045 (0.050)	None

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Table 6.3.6-7 Study use pattern for PENRED 240FS in/on Potatoes, Plot TRTDF (Seed Treatment and In-furrow Application)

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Method	Timing ^a	Application					Tank Mix Adjuvants
						Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Germansville, PA Region 1	EL008-08DA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.054 (0.060)	NA ^b	NA ^b	0.145 (0.163)	None
				In-furrow Spray	BBCH 00		0.092 (0.103)	NA ^b	19.01 (177.8)		None
Baptistown, NJ Region 1	EL009-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.054 (0.060)	NA ^b	NA ^b	0.145 (0.162)	None
				In-furrow Spray	BBCH 00		0.091 (0.102)	NA ^b	18.92 (177)		None
North Rose, NY Region 1	EL010-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.040 (0.045)	NA ^b	NA ^b	0.143 (0.160)	None
				In-furrow Spray	BBCH 00		0.103 (0.115)	NA ^b	14.98 (140.1)		None
North Rose, NY Region 1	EL011-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.040 (0.045)	NA ^b	NA ^b	0.144 (0.161)	None
				In-furrow Spray	BBCH 00		0.104 (0.116)	NA ^b	15.2 (142.2)		None
North Rose, NY Region 1	EL012-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.054 (0.061)	NA ^b	NA ^b	0.141 (0.158)	None
				In-furrow Spray	BBCH 00		0.087 (0.097)	NA ^b	19.64 (183.7)		None
Hunter River, Atlantic, Canada, Region 1	EL013-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.047 (0.053)	NA ^b	NA ^b	0.152 (0.170)	None
				In-furrow Spray	BBCH 00		0.104 (0.117)	NA ^b	6.96 (65.1)		None
Hunter River, Atlantic, Canada, Region 1	EL014-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.046 (0.051)	NA ^b	NA ^b	0.146 (0.164)	None
				In-furrow Spray	BBCH 00		0.101 (0.113)	NA ^b	6.72 (62.9)		None
Seven Springs, NC Region 2	EL015-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.069 (0.077)	NA ^b	NA ^b	0.140 (0.157)	None
				In-furrow Spray	BBCH 00		0.071 (0.080)	NA ^b	7.21 (67.4)		None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Method	Timing ^a	Application					Tank Mix Adjuvants
						Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Oviedo, FL Region 3	EL016-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.055 (0.062)	NA ^b	NA ^b	0.143 (0.160)	None
				In-furrow Spray	BBCH 00		0.087 (0.098)	NA ^b	19.36 (181.1)		None
Rockwood, Ontario Canada Region 5	EL017-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.045 (0.050)	NA ^b	NA ^b	0.149 (0.167)	None
				In-furrow Spray	BBCH 00		0.104 (0.117)	NA ^b	11.31 (105.8)		None
Arkansaw, WI Region 5	EL018-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.070 (0.078)	NA ^b	NA ^b	0.153 (0.171)	None
				In-furrow Spray	BBCH 00		0.084 (0.094)	NA ^b	16.7 (156.2)		None
Richland, IA Region 5	EL019-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.045 (0.050)	NA ^b	NA ^b	0.147	None
				In-furrow Spray	BBCH 00		0.104 (0.116)	NA ^b	16.44 (153.8)		None
Clarence, MO Region 5	EL020-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.048 (0.054)	NA ^b	NA ^b	0.142 (0.159)	None
				In-furrow Spray	BBCH 00		0.094 (0.105)	NA ^b	11.79 (110.3)		None
Gardner, KS Region 5	EL021-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.070 (0.079)	NA ^b	NA ^b	0.142 (0.159)	None
				In-furrow Spray	BBCH 00		0.070 (0.079)	NA ^b	10.71 (100.2)		None
Taber, Alberta Canada Region 7A	EL022-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.045 (0.050)	NA ^b	NA ^b	0.137 (0.154)	None
				In-furrow Spray	BBCH 00		0.093 (0.104)	NA ^b	15.14 (141.6)		None
Eaton, CO Region 8	EL023-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.071 (0.080)	NA ^b	NA ^b	0.141 (0.158)	None
				In-furrow Spray	BBCH 00		0.070 (0.078)	NA ^b	10.35 (96.8)		None
Fresno, CA Region 10	EL024-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.013 (0.014)	NA ^b	NA ^b	0.085 (0.095)	None
				In-furrow Spray	BBCH 00		0.072 (0.081)	NA ^b	15.05 (140.8)		None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Method	Timing ^a	Application					Tank Mix Adjuvants
						Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Jerome, ID Region 11	EL025-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.043 (0.048)	NA ^b	NA ^b	0.143 (0.160)	None
				In-furrow Spray	BBCH 00		0.100 (0.112)	NA ^b	13.59 (127.1)		None
Rupert, ID Region 11	EL026-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.066 (0.074)	NA ^b	NA ^b	0.145 (0.162)	None
				In-furrow Spray	BBCH 00		0.079 (0.088)	NA ^b	9.16 (85.7)		None
Ephrata, WA Region 11	EL027-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.040 (0.045)	NA ^b	NA ^b	0.144 (0.161)	None
				In-furrow Spray	BBCH 00		0.104 (0.116)	NA ^b	15.18 (142)		None
Hermiston, OR Region 11	EL028-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.070 (0.078)	NA ^b	NA ^b	0.149 (0.167)	None
				In-furrow Spray	BBCH 00		0.079 (0.088)	NA ^b	17.8 (166.5)		None
Payette, ID Region 11	EL029-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.048 (0.054)	NA ^b	NA ^b	0.144 (0.161)	None
				In-furrow Spray	BBCH 00		0.096 (0.107)	NA ^b	15.09 (141.2)		None
Ephrata, WA Region 11	EL030-08DA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.040 (0.045)	NA ^b	NA ^b	0.144 (0.161)	None
				In-furrow Spray	BBCH 00		0.104 (0.116)	NA ^b	15.24 (142.6)		None
Abbotsford, BC Canada Region 12	EL031-08HA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.045 (0.050)	NA ^b	NA ^b	0.143 (0.160)	None
				In-furrow Spray	BBCH 00		0.098 (0.110)	NA ^b	20.02 (187.3)		None
Minto, MB Canada Region 14	EL032-08DA	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.046 (0.051)	NA ^b	NA ^b	0.145 (0.163)	None
				In-furrow Spray	BBCH 00		0.100 (0.112)	NA ^b	19.7 (184.3)		None
Wellwood, MB Canada Region 14	EL033-08HB	2008	BYF 14182 FS240	Seed Treatment	BBCH 00	TRTDF	0.045 (0.050)	NA ^b	NA ^b	0.146 (0.164)	None
				In-furrow Spray	BBCH 00		0.102 (0.114)	NA ^b	19.56 (183)		None

The residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB), BYF 14182 homoglutathione (Pen-HGT), BYF 14182 pyrazole-4-carboxamide (Pen-PCX), and BYF 14182-bis-desmethyl-3-carboxylic acid (Pen-D3C) were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards (Method EL-002-P09-02, M-364625-01-1, MRID No. 48023707). Individual residues of penflufen, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C were all less than the method LOQ (<0.01 ppm) in potato tubers. Residues are shown in Table 6.3.6-8.

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Table 6.3.6-8 Residue Data with Potatoes.

Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Baptistown, NJ Region 1	EL009- 08HA	Potato	2008	1	TRTDS	Dark Red Norland	Fresh Tubers	19.7	0.054 (0.060)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
North Rose, NY Region 1	EL010- 08HA	Potato	2008	1	TRTDS	Carola	Fresh Tubers	21.7	0.040 (0.045)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
North Rose, NY Region 1	EL011- 08HA	Potato	2008	1	TRTDS	NY-79	Fresh Tubers	18.4	0.040 (0.045)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
North Rose, NY Region 1	EL012- 08HA	Potato	2008	1	TRTDS	Superior	Fresh Tubers	19.2	0.054 (0.061)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Hunter River, Atlantic, Canada, Region 1	EL013- 08HA	Potato	2008	1	TRTDS	Yukon Gold	Fresh Tubers	23.5	0.045 (0.050)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Hunter River, Atlantic, Canada, Region 1	EL014- 08HA	Potato	2008	1	TRTDS	Shopody	Fresh Tubers	25.1	0.046 (0.051)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Seven Springs, NC Region 2	EL015- 08HA	Potato	2008	2	TRTDS	Red La Soda	Fresh Tubers	20.1	0.069 (0.077)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Oviedo, FL Region 3	EL016- 08HA	Potato	2008	3	TRTDS	Red La Soda	Fresh Tubers	22.4	0.055 (0.062)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Rockwood, Ontario, Canada Region 5	EL017- 08HA	Potato	2008	5	TRTDS	Goldrush	Fresh Tubers	20.8	0.046 (0.051)	ECH	<0.01 0.029 ^c	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Arkansaw, WI Region 5	EL018- 08HA	Potato	2008	5	TRTDS	Russet Burbank	Fresh Tubers	21.8	0.070 (0.078)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Richland, IA Region 5	EL019- 08HA	Potato	2008	5	TRTDS	Kennebec	Fresh Tubers	15.8	0.045 (0.050)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Clarence, MO Region 5	EL020- 08HA	Potato	2008	5	TRTDS	Kennebec	Fresh Tubers	18.9	0.048 (0.054)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS Region 5	EL021- 08HA	Potato	2008	5	TRTDS	Kennebec	Fresh Tubers	20.6	0.070 (0.079)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Taber, Alberta, Canada Region 7A	EL022- 08HA	Potato	2008	7A	TRTDS	Russet Burbank	Fresh Tubers	24.6	0.045 (0.050)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Eaton, CO Region 8	EL023- 08HA	Potato	2008	8	TRTDS	Rio Grande Russet G3	Fresh Tubers	19.7	0.071 (0.080)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Fresno, CA Region 10	EL024- 08HA	Potato	2008	10	TRTDS	CalWhite	Fresh Tubers	17.6	0.013 (0.015)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Jerome, ID Region 11	EL025- 08HA	Potato	2008	11	TRTDS	Ranger Russet	Fresh Tubers	23.9	0.043 (0.048)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Rupert, ID Region 11	EL026- 08HA	Potato	2008	11	TRTDS	Russet Burbank	Fresh Tubers	23.8	0.066 (0.074)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Ephrata, WA Region 11	EL027- 08HA	Potato	2008	11	TRTDS	Russet Burbank	Fresh Tubers	19.6	0.040 (0.045)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Hermiston, OR Region 11	EL028- 08HA	Potato	2008	11	TRTDS	Russet Burbank	Fresh Tubers	20.5	0.071 (0.079)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Payette, ID Region 11	EL029- 08HA	Potato	2008	11	TRTDS	Ranger Russet	Fresh Tubers	21.1	0.047 (0.053)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Abbotsford, British Columbia, Canada Region 12	EL031- 08HA	Potato	2008	12	TRTDS	Warba	Fresh Tubers	18.6	0.045 (0.050)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Wellwood, Manitoba, Canada Region 14	EL033- 08HB	Potato	2008	14	TRTDS	Russet Burbank	Fresh Tubers	26.7	0.045 (0.050)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb a ^b /A (kg ai/ha)	PHI ^b (Days)	Residues				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Germansville, PA Region 1	EL008- 08DA	Potato	2008	1	TRTDS	Dark Red Norland	Fresh Tubers	19.6	0.054 (0.060)	ECH-10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								19.1		ECH-5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								20.3		ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								18.3		ECH+5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								18.6		ECH+10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Ephrata, WA Region 11	EL030- 08DA	Potato	2008	11	TRTDS	Russet Burbank	Fresh Tubers	21.6	0.040 (0.045)	ECH-10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								23.8		ECH-5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								23.6		ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								23.4		ECH+5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								24.1		ECH+10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Minto, Manitoba, Canada Region 14	EL032- 08DA	Potato	2008	14	TRTDS	Norland	Fresh Tubers	20.5	0.045 (0.050)	ECH-10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								21.6		ECH-5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								21.0		ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								20.5		ECH+5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								20.0		ECH+10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Baptistown, NJ Region 1	EL009- 08HA	Potato	2008	1	TRTDF	Dark Red Norland	Fresh Tubers	19.7	0.145 (0.162)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
North Rose, NY Region 1	EL010- 08HA	Potato	2008	1	TRTDF	Carola	Fresh Tubers	19.7	0.143 (0.160)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
North Rose, NY Region 1	EL011- 08HA	Potato	2008	1	TRTDF	NY-79	Fresh Tubers	20.0	0.144 (0.161)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
North Rose, NY Region 1	EL012- 08HA	Potato	2008	1	TRTDF	Superior	Fresh Tubers	18.9	0.141 (0.158)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Hunter River, Atlantic, Canada Region 1	EL013- 08HA	Potato	2008	1	TRTDF	Yukon Gold	Fresh Tubers	25.8	0.152 (0.170)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Hunter River, Atlantic, Canada Region 1	EL014- 08HA	Potato	2008	1	TRTDF	Shopody	Fresh Tubers	21.5	0.146 (0.164)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Seven Springs, NC Region 2	EL015- 08HA	Potato	2008	2	TRTDF	Red La Soda	Fresh Tubers	20.0	0.140 (0.157)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Oviedo, FL Region 3	EL016- 08HA	Potato	2008	3	TRTDF	Red La Soda	Fresh Tubers	19.6	0.143 (0.160)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Rockwood, Ontario, Canada Region 5	EL017- 08HA	Potato	2008	5	TRTDF	Goldrush	Fresh Tubers	22.4	0.149 (0.167)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Arkansaw, WI Region 5	EL018- 08HA	Potato	2008	5	TRTDF	Russet Burbank	Fresh Tubers	21.5	0.153 (0.171)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Richland, IA Region 5	EL019- 08HA	Potato	2008	5	TRTDF	Kennebec	Fresh Tubers	21.1	0.147 (0.165)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Clarence, MO Region 5	EL020- 08HA	Potato	2008	5	TRTDF	Kennebec	Fresh Tubers	18.4	0.142 (0.159)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS Region 5	EL021- 08HA	Potato	2008	5	TRTDF	Kennebec	Fresh Tubers		0.142 (0.159)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Taber, Alberta, Canada Region 7A	EL022- 08HA	Potato	2008	7A	TRTDF	Russet Burbank	Fresh Tubers	22.4	0.137 (0.154)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Eaton, CO Region 8	EL023- 08HA	Potato	2008	8	TRTDF	Rio Grande Russet G3	Fresh Tubers	19.1	0.141 (0.158)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Fresno, CA Region 10	EL024- 08HA	Potato	2008	10	TRTDF	CalWhite	Fresh Tubers	16.5	0.085 (0.095)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Jerome, ID Region 11	EL025- 08HA	Potato	2008	11	TRTDF	Ranger Russet	Fresh Tubers	24.2	0.143 (0.160)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Rupert, ID Region 11	EL026- 08HA	Potato	2008	11	TRTDF	Russet Burbank	Fresh Tubers	22.0	0.145 (0.162)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Ephrata, WA Region 11	EL027-08HA	Potato	2008	11	TRTDF	Russet Burbank	Fresh Tubers	20.3	0.144 (0.161)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Hermiston, OR Region 11	EL028-08HA	Potato	2008	11	TRTDF	Russet Burbank	Fresh Tubers	20.0	0.149 (0.167)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Payette, ID Region 11	EL029-08HA	Potato	2008	11	TRTDF	Ranger Russet	Fresh Tubers	22.8	0.144 (0.161)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Abbotsford, British Columbia, Canada Region 12	EL031-08HA	Potato	2008	12	TRTDF	Warba	Fresh Tubers	19.3	0.143 (0.160)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
Wellwood, Manitoba, Canada Region 14	EL033-08HB	Potato	2008	14	TRTDF	Russet Burbank	Fresh Tubers	25.7	0.146 (0.164)	ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Germansville, PA Region 1	EL008-08DA	Potato	2008	1	TRTDF	Dark Red Norland	Fresh Tubers	19.8	0.145 (0.163)	ECH-10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								20.2		ECH-5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								20.2		ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								19.5		ECH+5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								19.3		ECH+10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Ephrata, WA Region 11	EL030-08DA	Potato	2008	11	TRTDF	Russet Burbank	Fresh Tubers	23.8	0.144 (0.161)	ECH-10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								23.3		ECH-5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								24.6		ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								24.5		ECH+5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								25.4		ECH+10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^a Lb ai/A (kg ai/ha)	PHI ^b (Days)	Residue (ppm)				
											BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Minto, Manitoba, Canada Region 14	EL032- 08DA	Potato	2008	14	TRTDF	Norland	Fresh Tubers	19.0	0.145 (0.163)	ECH-10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								20.2		ECH-5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								19.7		ECH	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								20.1		ECH+5	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01
								19.0		ECH+10	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01

^a Seed potatoes were treated with BYF 14182 240FS at a target rate of 2 g ai/100 kg seed piece and planted into the TRTDS and TRTDF plots (seeding rates ranged from 2245 to 4000 kg seed pieces/ha, except for trial EL024-08HA in which the seeding rates were 770 and 697 kg seed pieces/ha for the TRTDS and TRTDF plots, respectively) resulting in soil loading rates ranging from 45 to 80 g BYF 14182/ha (0.040 to 0.071 lb BYF 14182/A; except for trial EL024-08HA which had a soil loading rate of 14 g BYF 14182/ha). Following planting, the seed potatoes in the TRTDF plots received an in-furrow application with BYF 14182 240FS at rates ranging from 78 to 117 g BYF 14182/ha (0.070 to 0.104 lb BYF 14182/A) that resulted in a combined total application rate ranging from 154 to 171 g BYF 14182/ha (0.137 to 0.153 lb BYF 14182/A; except for trial EL024-08HA which had a combined total application rate of 95 g BYF 14182/ha).

^b ECH indicates samples that were collected at earliest commercial harvest. Samples collected at ECH-10 and ECH-5 were collected at 5 and 10 days before ECH, respectively, and samples collected at ECH+5 and ECH+10 were collected at 5 and 10 days after ECH, respectively.

^c This value is the average of three analyses and is considered aberrant (see conclusions).

Conclusion

Seed potatoes were treated with PENRED 240FS at 2 g ai/100 kg seed piece and planted into the TRTDS and TRTDF plots (seeding rates ranged from 2245 to 4000 kg seed pieces/ha) resulting in soil loading rates ranging from 45 to 80 g BYF 14182/ha (0.040 to 0.071 lb BYF 14182/A). Following planting, the seed potatoes in the TRTDF plots received an in-furrow application with PENRED 240FS at rates ranging from 78 to 117 g BYF 14182/ha (0.070 to 0.104 lb BYF 14182/A) that resulted in a combined total application rate ranging from 154 to 171 g BYF 14182/ha (0.137 to 0.153 lb BYF 14182/A). In all trials, single control samples and duplicate treated samples were collected from each plot at earliest commercial harvest (ECH).

The residues of penflufen (BYF 14182) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB), BYF 14182 homoglutathione (Pen-HGT), BYF 14182 pyrazole-4-carboxamide (Pen-PCX), and BYF 14182-bis-desmethyl-3-carboxylic acid (Pen-D3C) residue were quantitated by high performance liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labelled internal standards.

Seed Piece Treatment (TRTDS)

Individual residues of penflufen, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C were less than the LOQ (<0.01 ppm) in all of the potato trials where treated seed pieces alone were planted, except for one sample in one trial (EL017-08HA) which had residues of parent (penflufen) of 0.029 ppm. While this result was confirmed by reanalysis, penflufen residues from the duplicate sample in the same plot were significantly below the LOQ of the method. Further, residues in potatoes treated at 800 g/ha (approximately 16X the rate used in this plot) were less than the LOQ of 0.01 ppm (see KIIA 6.5.3/04, MRID No. 48023737). Given the totality of the seed treatment data, this value is considered an aberrant result.

Seed Piece plus In-furrow Treatment (TRTDF)

Individual residues of penflufen, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C were less than the LOQ (<0.01 ppm) in all of the potato trials where treated seed pieces were planted and an in-furrow application was made (TRTDF plots).

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in potato matrices for up to 9 months and may be stable for longer periods of time. Additional storage stability data reflecting longer durations of frozen storage are underway but have not yet been submitted to regulatory authorities. Provided the additional storage stability data demonstrates that residues of penflufen and its metabolites, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C are stable in potato matrices for up to 20 months, this study is considered scientifically acceptable.

B.7.7.2.1 Corn Processing Study

Report:	KIIA 6.5.3/01; Milo, J., Ardiel, K.; 2010; M-364871-01-2
Title:	BYF 14182 240FS Red – Magnitude of Residues In/On Corn (5X)
Report No.	RAELP054
Document No.:	M-364871-01-2
	MRID No. 48023734
	PMRA No. 1885937
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1520, Processed Food/Feed PMRA Residue Chemistry Guidelines DIR98-02: Section 10 Processed Food/Feed
GLP	Yes (certified laboratory)
Acceptability	Study is scientifically acceptable

Executive Summary

In order to determine the need for a processing study, an exaggerated rate corn field trial was conducted. One corn field trial was in Canada in 2008 to measure residues of BYF 14182 (penflufen) and its metabolites, BYF 14182-3-hydroxybutyl (Pen-3HB), and BYF 14182-homogluthathione (Pen-HGT) in corn grown from seed treated with penflufen at an exaggerated rate of 50 g ai/100 kg seed, 5X the currently proposed application rate.

The BYF 14182-derived residues in corn matrices were quantitated by high performance liquid chromatography-electrospray ionization / tandem mass spectrometry (LC-MS/MS) using isotopically labeled internal standards. The method limit of quantitation (LOQ) for penflufen, Pen-3HB, and Pen-HGT was 0.01 ppm in all corn matrices.

No quantifiable residues of BYF 14182 or its metabolites, Pen-3HB and Pen-HGT, were observed in corn grain grown from seed treated with penflufen at a rate of 50 g ai/100 kg seed (5X the currently proposed seed treatment application rate).

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Corn Field Trial

Material and Methods

One field trial was conducted with PENRED 240FS (BYF 14182 240FS Red) in Canada in 2008. The site was representative of the areas in which corn is commonly grown. The crop was grown under typical climatic conditions and agricultural practices for corn. PENRED 240FS is a flowable suspension formulation containing the fungicide penflufen

(BYF 14182) at a concentration of 240 g ai/L. PENRED 240FS is being proposed for seed treatment for corn at 10 g ai/100 kg corn seed for the control of fungal pests.

PENRED 240FS was applied to seed batches at a target application rate of 50 g ai/100 kg of seed. The actual rate of test item applied was 52.725 g ai/100 kg of seed. This rate is approximately five times the total maximum proposed label rate for seed treatment in field corn. The GAP used for this study in North America is summarized in Table 6.5.3-1.

Table 6.5.3-1 Study Use Pattern for BYF 14182 in Corn.

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Corn	North America	Seed Treatment	1	50	NA	NA	NA

Grain samples were collected at a target crop growth stage of BBCH 87 to 89 (physiological maturity to fully ripe). Trial site conditions, including soil characteristics are summarized in Table 6.5.3-2.

Table 6.5.3-2 Trial site conditions for PENRED 240FS in/on Field Corn

Study Location (City, State)	Trial Number	Crop	Soil Characteristics				Meteorological Data	
			Type	% OM	pH	CEC	Total Rainfall (mm)	Average Temp. Range (°C)
Rockwood, ON	RAELP054-01-08H	Field Corn	Sandy Loam	3.4	7.5	12.4	621.1	3-25.9

The BYF 14182-derived residues were quantitated by high performance liquid chromatography-electrospray ionization / tandem mass spectrometry (LC-MS/MS) using isotopically labeled internal standards (Method EL-002-P09-01). While no data validating Method EL-002-P09-01 at the reported method limit of quantitation of 0.01 ppm were provided within the current study report, the method has been validated during the corn field trials (M-364628-01) at 0.01 ppm in corn. Recovery of penflufen from corn grain was measured concurrently with the set of samples to verify method performance. Based on the submitted data, the lower limit of method validation (LLMV) for corn grain is 0.025 ppm, though the actual method LOQ may be closer to 0.01 ppm. Individual recoveries at fortification levels between 0.025 and 0.20 mg/kg penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, as shown in Table 6.5.3-3. All results of the method validation are in accordance with the general requirements for residue analytical methods, and demonstrated acceptable method performance during sample analysis.

Table 6.5.3-3 Summary of Recoveries of Penflufen on Corn Grain

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Stan. % Dev.
Grain	Pen-3HB	0.025	2	98, 96	97	NA
		0.050	2	98, 97	98	
		0.200	1	101	NA	
	Penflufen	0.025	2	92, 91	92	
		0.050	2	100, 99	100	
		0.200	1	98	NA	
	Pen-HGT	0.025	2	81, 85	83	
		0.050	2	87, 90	88	
		0.200	1	83	NA	

NA is not applicable.

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.5.3-4.

Table 6.5.3-4 Summary of Storage Conditions for Corn grain

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C) ^a	Actual Study Duration (days) ^b	Limit of Demonstrated Storage Stability (days) ^c
Penflufen, Pen-3HB, and Pen-HGT	Corn Grain	< 0°C	371	270

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KIIA 6.1.1/02.

Findings

The control samples were analyzed concurrently with the treated samples. The results of the analysis indicated that there were no apparent residues in the control corn grain above the LLMV (0.025 ppm) for any analyte. The BYF14182 residue data for the treated samples are summarized in Table 6.5.3-5.

Table 6.5.3-5 Field Corn Residue Data from the 5X Field Trials with Penflufen.

Location (City, Province)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	kg ai/ha(Lb ai/A) Total Rate	PHI	Penflufen-HGT	Penflufen-3HB	Penflufen
Rockwood, ON	01-08H	Corn	2008	5	TRTD 1	39D81	Grain	64.53	0.010 (0.009)	150	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

Conclusions:

No quantifiable residues of BYF 14182 or its metabolites, Pen-3HB and Pen-HGT, were observed in corn grain from one trial site after a seed treatment application of PENRED 240FS at 50 g ai/100 kg corn seed.

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.7.2.2 Wheat Processing Study

Report:	KIIA 6.5.3/02; Milo, J., Huber, L.; 2010; M-365262-01-1
Title:	BYF 14182 240 FS Red – Magnitude of Residues In/On Wheat (5X)
Report No.	RAELP064
Document No.:	M-365262-01-1
	MRID No. 48023735
	PMRA No. 1885977
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1520, Processed Food/Feed
	PMRA Residue Chemistry Guidelines DIR98-02: Section 10 Processed Food/Feed
GLP	Yes (certified laboratory)
Acceptability	Study is scientifically acceptable

Executive Summary

In order to determine the need for a processing study, exaggerated rate wheat field trials were conducted. Three wheat field trials were conducted in Canada in 2008 to measure residues of BYF 14182 (penflufen) and its metabolites, BYF 14182-3-hydroxybutyl (Pen-3HB), and BYF 14182-homogluthathione (Pen-HGT) in wheat grown from seed treated with penflufen at an exaggerated rate of 25 g ai/100 kg seed, 5X the currently proposed application rate.

The BYF 14182-derived residues in wheat forage, grain, hay and straw were quantitated by high performance liquid chromatography-electrospray ionization / tandem mass spectrometry (LC-MS/MS) using isotopically labeled internal standards. The limit of quantitation (LOQ) is 0.01 ppm for each analyte.

No quantifiable residues of BYF 14182 or its metabolites, Pen-3HB and Pen-HGT, were observed in wheat grain, hay or straw grown from seed treated with penflufen at a rate of 25 g ai/100 kg seed (5X the currently proposed seed treatment application rate). There were no quantifiable residues of BYF 14182 or its metabolites in forage in two of three trials and the average residue of Pen-3HB in one trial was approximately 0.022 ppm, slightly above the LOQ of the method.

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Wheat Crop Field Trials

Material and Methods

Three field trials were conducted with PENRED 240FS (BYF 14182 240FS Red) in Canada in 2008. The sites were representative of the areas in which wheat is commonly grown. The crops were grown under typical climatic conditions and agricultural practices for corn. PENRED 240FS is a flowable suspension formulation containing the fungicide Penflufen (BYF 14182) at a concentration of 240 g ai/L.

PENRED 240FS was applied to seed batches at a target application rate of 25 g ai/100 kg of seed. The actual rate of test item applied was 26.675 g ai/100 kg of seed. This rate is approximately five times the total maximum proposed label rate for seed treatment in wheat. The GAP used for this study in North America is summarized in Table 6.5.3-6.

Table 6.5.3-6 Study Use Pattern for BYF 14182 in Wheat.

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Wheat	North America	Seed Treatment	1	25	NA	NA	NA

Forage samples were collected at a target crop growth stage of BBCH 22 to 30 (two tillers detectable to beginning of stem elongation). Hay samples were cut at a target crop growth stage of BBCH 63 to 85 (flowering, 30% anthers mature to soft dough). Samples were dried and then bagged within 7 to 9 days of cutting. Grain and straw samples were collected at a target crop growth stage of BBCH 87 to 89 (hard dough to fully ripe).

Trial site conditions, including soil characteristics, are summarized in Table 6.5.3-7.

Table 6.5.3-7 Trial site conditions for PENRED 240FS in/on Wheat

Study Location (City, State)	Trial Number	Crop/Variety	Soil Characteristics				Meteorological Data	
			Type	% OM	pH	CEC	Total Rainfall (mm)	Average Temp. Range (°C)
Rockwood, ON	RAELP064-01-08H	Wheat/ AC Barrie	Sandy Loam	3.4	7.5	12.4	452.9	3.4 - 25.0
Odessa, SK	RAELP064-02-08H	Wheat/ AC Elsa	Loam	2.5	8.2	n/a	276.5	4.6 – 25.7
Indian Head, SK	RAELP064-03-08H	Wheat/ AC Crystal	Clay	4.3	7.8	n/a	218.8	0.1 – 25.2

n/a = Not available

The BYF 14182-derived residues were quantitated by high performance liquid chromatography-electrospray ionization/tandem mass spectrometry (LC-MS/MS) using isotopically labeled internal standards (method EL-002-P09-01). The limit of quantitation (LOQ) is 0.01 ppm for each analyte. The method was validated by analysis of wheat forage, grain, hay and straw samples fortified with penflufen, Pen-3HB and Pen-HGT at 0.01 ppm. Additionally recoveries of penflufen and its metabolites from wheat matrices were measured concurrently with the set of control and treated samples to verify method

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performance. Mean recoveries at fortification levels between 0.01 and 0.20 mg/kg penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, and at the LOQ, the SD was $\leq 20\%$ as shown in Table 6.5.3-8. All results of the method validation are in accordance with the general requirements for residue analytical methods, and demonstrated acceptable method performance during sample analysis.

Table 6.5.3-8 Summary of Recoveries of Penflufen on What, Forage, Hay, Grain and Straw

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	Stan. % Dev.
Forage	Pen-3HB	0.010	7	92, 93, 89, 94, 96, 86, 101	93%	5%
		0.050	2	98, 103	100%	NA
		0.200	2	96, 94	95%	NA
	Penflufen	0.010	7	89, 103, 83, 91, 91, 70, 93	89%	10%
		0.050	2	93, 99	96%	NA
		0.200	2	96, 95	95%	NA
	Pen-HGT	0.010	7	99, 111, 76, 99, 89, 74, 86	91%	13%
		0.050	2	106, 90	98%	NA
		0.200	2	92, 94	93%	NA
Hay	Pen-3HB	0.010	7	108, 99, 98, 85, 93, 94, 89	95%	7%
		0.050	2	93, 93	93%	NA
		0.200	2	95, 91	93%	NA
	Penflufen	0.010	7	74, 110, 88, 97, 91, 93, 101	93%	11%
		0.050	2	93, 85	89%	NA
		0.200	2	87, 89	88%	NA
	Pen-HGT	0.010	7	71, 91, 72, 106, 76, 97, 105	88%	15%
		0.050	2	90, 95	92%	NA
		0.200	2	90, 89	89%	NA
Grain	Pen-3HB	0.010	7	95, 94, 96, 98, 100, 94, 101	97%	3%
		0.050	2	98, 100	99%	NA
		0.200	2	99, 96	97%	NA
	Penflufen	0.010	7	95, 92, 99, 79, 91, 94, 104	93%	8%
		0.050	2	107, 90	98%	NA
		0.200	2	89, 90	90%	NA
	Pen-HGT	0.010	7	96, 87, 100, 99, 100, 74, 97	93%	10%
		0.050	2	97, 101	99%	NA
		0.200	2	105, 90	97%	NA
Straw	Pen-3HB	0.010	7	96, 98, 105, 106, 97, 81, 89	96%	9%
		0.050	2	89, 101	95%	NA
		0.200	2	95, 99	97%	NA
	Penflufen	0.010	7	82, 91, 92, 102, 86, 75, 84	87%	9%
		0.050	2	101, 88	95%	NA
		0.200	2	90, 87	88%	NA
	Pen-HGT	0.010	7	82, 94, 86, 89, 78, 79, 76	83%	7%
		0.050	2	85, 101	93%	NA
		0.200	2	87, 98	92%	NA

NA is not applicable.

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.5.3-9.

Table 6.5.3-9 Summary of Storage Conditions for Wheat forage, hay, Straw and Grain

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C)^a	Actual Study Duration (days)^b	Limit of Demonstrated Storage Stability (days)^c
Penflufen, Pen-3HB, and Pen-HGT	Wheat forage	< 0°C	460	270
Penflufen, Pen-3HB, and Pen-HGT	Wheat hay and straw	< 0°C	432	264
Penflufen, Pen-3HB, and Pen-HGT	Wheat grain	< 0°C	402	269

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KHIA 6.1.1/02, MRID No. 48023721.

Findings

The control samples were analyzed concurrently with the treated samples. The results of the analysis indicated that there were no apparent residues in the control wheat forage, hay, straw or grain above the LOQ (0.01 ppm) for any analyte. The BYF14182 residue data for the treated samples are summarized in Table 6.5.3-10.

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Table 6.5.3-10 Wheat Residue Data from the 5X Field Trials with Penflufen.

Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate	PHI	Penflufen-HGT	Penflufen-3HB	Penflufen
Wheat Forage													
Rockwood, ON	01-08H	Wheat	2008	5	TRTD 1	AC Barrie	Forage	86.58	0.031 (0.035)	45	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Odessa, SK	02-08H	Wheat	2008	7	TRTD 1	AC Elsa	Forage	79.03	0.023 (0.025)	43	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, SK	03-08H	Wheat	2008	14	TRTD 1	AC Crystal	Forage	80.97	0.021 (0.024)	36	<0.01 <0.01 Average <0.01	0.0197 0.0249 Average 0.0223	<0.01 <0.01 Average <0.01
Wheat Hay													
Rockwood, ON	01-08H	Wheat	2008	5	TRTD 1	AC Barrie	Hay	47.87	0.031 (0.035)	69	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Odessa, SK	02-08H	Wheat	2008	7	TRTD 1	AC Elsa	Hay	36.56	0.023 (0.025)	68	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, SK	03-08H	Wheat	2008	14	TRTD 1	AC Crystal	Hay	51.41	0.021 (0.024)	62	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate	PHI	Penflufen-HGT	Penflufen-3HB	Penflufen
Wheat Grain													
Rockwood, ON	01-08H	Wheat	2008	5	TRTD 1	AC Barrie	Grain	21.21	0.031 (0.035)	98	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Odessa, SK	02-08H	Wheat	2008	7	TRTD 1	AC Elsa	Grain	25.98	0.023 (0.025)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, SK	03-08H	Wheat	2008	14	TRTD 1	AC Crystal	Grain	18.06	0.021 (0.024)	115	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Wheat Straw													
Rockwood, ON	01-08H	Wheat	2008	5	TRTD 1	AC Barrie	Straw	24.79	0.031 (0.035)	98	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Odessa, SK	02-08H	Wheat	2008	7	TRTD 1	AC Elsa	Straw	41.33	0.023 (0.025)	100	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Indian Head, SK	03-08H	Wheat	2008	14	TRTD 1	AC Crystal	Straw	40.45	0.021 (0.024)	115	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

Conclusions:

No quantifiable residues of BYF 14182 or its metabolites, Pen-3HB and Pen-HGT, were observed in wheat grain, hay or straw grown from seed treated with penflufen at a rate of 25 g ai/100 kg seed (5X the currently proposed seed treatment application rate). There were no quantifiable residues of BYF 14182 or its metabolites in forage in two of three trials and the average residue of Pen-3HB in one trial was approximately 0.022 ppm, slightly above the LOQ of the method.

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.7.2.3 Soybean Processing Study

Report:	KIIA 6.5.3/03; Milo, J., Huber, L.; 2010; M-364910-01-2
Title:	BFY 14182 240FS Red – Magnitude of Residues In/On Soybean (5X)
Report No.	RAELP065
Document No.:	M-364910-01-2
	MRID No. 48023736
	PMRA No. 1885939
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1520, Processed Food/Feed
	PMRA Residue Chemistry Guidelines DIR98-02: Section 10 Processed Food/Feed
GLP	Yes (certified laboratory)
Acceptability	Study is scientifically acceptable

Executive Summary

In order to determine the need for a processing study, exaggerated rate soybean field trials were conducted. Three soybean field trials were conducted in Canada and the United States in 2008 to measure residues of BYF 14182 (penflufen) and its metabolites, BYF 14182-3-hydroxybutyl (Pen-3HB), and BYF 14182-homogluthathione (Pen-HGT) in soybeans grown from seed treated with penflufen at an exaggerated rate of 25 g ai/100 kg seed, 5X the currently proposed application rate.

The BYF 14182-derived residues in soybean shelled immature seeds, podded immature seeds, mature seeds, forage and hay were quantitated by high performance liquid chromatography-electrospray ionization / tandem mass spectrometry (LC-MS/MS) using isotopically labeled internal standards. The limit of quantitation (LOQ) is 0.01 ppm for each analyte.

No quantifiable residues of BYF 14182 or its metabolites, Pen-3HB and Pen-HGT, were observed in shelled immature seed, podded immature seed, mature seed, or hay samples. There were no quantifiable residues of BYF 14182 or its metabolites in forage in two of three trials and the average residue of Pen-3HB in one trial was at the method LOQ of 0.01 ppm.

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

Soybean Field Trials

Material and Methods

Three field trials were conducted with PENRED 240FS (BYF 14182 240FS Red) in the United States and Canada in 2008. The sites were representative of the areas in which soybeans are commonly grown. The crops were grown under typical climatic conditions and agricultural practices for soybeans. PENRED 240FS is a flowable suspension formulation containing the fungicide Penflufen (BYF 14182) at a concentration of 240 g ai/L. PENRED 240FS is being proposed for seed treatment for soybeans at 5 g ai/100 kg soybean seed for the control of fungal pests.

PENRED 240FS was applied to seed batches at a target application rate of 25 g ai/100 kg of seed. This rate is approximately five times the total maximum proposed label rate for seed treatment in soybean. The GAP used for this study in North America is summarized in Table 6.5.3-11.

Table 6.5.3-11 Study Use Pattern for BYF 14182 in Soybean.

Crop	Location	Type of appl.	No of appl.	Use rate g as/100 kg seed	Water volume min-max	Spray Interval (days)	PHI (days)
Soybean	North America	Seed Treatment	1	25	NA	NA	NA

Forage samples were cut 43 to 62 days after planting at a crop growth stage of BBCH 45 to 51 (development of harvest vegetative plant parts first flower buds just visible). At each site, hay samples were cut 75 to 101 days after planting at a crop growth stage of approximately BBCH 69 to 73 (first pods visible to approximately 30% of pods have

reached final length). Samples were dried and then bagged within 3 to 7 days of cutting. Duplicate shelled immature samples and podded immature samples were collected 91 to 134 days after planting at BBCH 75 to 79 from all plots. Duplicate mature seed samples were collected at 118 to 174 days from all plots.

Trial site conditions, including soil characteristics are summarized in Table 6.5.3-12.

Table 6.5.3-12 Trial site conditions for PENRED 240FS in/on Soybeans

Study Location (City, State)	Trial Number	Crop	Soil Characteristics				Meteorological Data	
			Type	% OM	pH	CEC	Total Rainfall (mm)	Average Temp. Range (°C)
Sycamore, GA	RAEP065/01-08H	Soybean	Loamy sand	n/a	n/a	n/a	732.6	-3.3-37.4
Rockwood, ON	RAELP065-02-08H	Soybean	Sandy Loam	2.1	7.1	12.4	571.3	3.4 - 25
Springfield, NE	RAELP065-03-08H	Soybean	Silt Loam	2.1	7.1	12.7	782.3	-3.3 - 35

n/a = not analyzed.

The BYF 14182-derived residues were quantitated by high performance liquid chromatography-electrospray ionization / tandem mass spectrometry (LC-MS/MS) using isotopically labeled internal standards (Method EL-002-P09-01). The method was validated by analysis of soybean matrices fortified with penflufen, Pen-3HB and Pen-HGT at 0.01 ppm. The limit of quantitation (LOQ) is 0.01 ppm for each analyte. Recovery of penflufen from soybean was also measured concurrently with the set of samples to verify method performance. Mean recoveries at fortification levels between 0.01 and 0.20 mg/kg penflufen and its metabolites Pen-3HB and Pen-HGT were within the acceptable range of 70-110%, SD \leq 20% as shown in Table 6.5.3-13. All results of the method validation are in accordance with the general requirements for residue analytical methods, and demonstrated acceptable method performance during sample analysis.

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Table 6.5.3-13 Summary of Recoveries of Penflufen on Soybean Forage, Hay, Immature and Mature Beans.

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	% Stan. Dev.
Forage	Pen-3HB	0.010	6	72, 90, 92, 90, 96, 86	88%	8%
		0.050	2	85, 82	84%	NA
		0.100	3	81, 96, 100	92%	10%
		0.200	2	91, 88	90%	NA
	Penflufen	0.010	6	99, 72, 76, 92, 82, 85	85%	10%
		0.050	2	83, 84	83%	NA
		0.100	3	86, 90, 94	90%	4%
		0.200	2	94, 92	93%	NA
	Pen-HGT	0.010	6	74, 102, 97, 92, 97, 114	96%	13%
		0.050	2	78, 81	80%	NA
		0.100	3	88, 101, 104	98%	9%
		0.200	2	95, 79	87%	NA
Hay	Pen-3HB	0.010	7	85, 82, 80, 79, 87, 94, 77	83%	6%
		0.050	2	81, 78	79%	NA
		0.100	1	79	NA	NA
		0.200	2	90, 86	88%	NA
	Penflufen	0.010	7	91, 72, 82, 88, 83, 74, 105	85%	11%
		0.050	2	78, 77	78%	NA
		0.100	1	73	NA	NA
		0.200	2	83, 82	83%	NA
	Pen-HGT	0.010	7	81, 95, 99, 88, 110, 107, 117	99%	13%
		0.050	2	96, 80	88%	NA
		0.100	1	86	NA	NA
		0.200	2	100, 83	92%	NA
Shelled Immature Seed	Pen-3HB	0.010	7	88, 95, 100, 95, 99, 96, 92	95%	4%
		0.050	2	95, 94	95%	NA
		0.100	1	92	NA	NA
		0.200	2	96, 97	96%	NA
	Penflufen	0.010	7	85, 88, 88, 97, 86, 84, 98	89%	6%
		0.050	2	90, 97	93%	NA
		0.100	1	84	NA	NA
		0.200	2	90, 92	91%	NA
	Pen-HGT	0.010	7	108, 87, 97, 97, 94, 87, 89	94%	7%
		0.050	2	101, 99	100%	NA
		0.100	1	104	NA	NA
		0.200	2	100, 100	100%	NA

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Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean % Recovery	% Stan. Dev.
Podded Immature Seed	Pen-3HB	0.010	7	88, 85, 84, 81, 88, 91, 86	86%	3%
		0.050	2	85, 86	86%	NA
		0.100	1	96	NA	NA
		0.200	2	92, 94	93%	NA
	Penflufen	0.010	7	86, 97, 92, 87, 91, 88, 85	89%	4%
		0.050	2	89, 83	86%	NA
		0.100	1	91	NA	NA
		0.200	2	89, 91	90%	NA
	Pen-HGT	0.010	7	104, 107, 88, 84, 113, 95, 81	96%	12%
		0.050	2	85, 77	81%	NA
		0.100	1	102	NA	NA
		0.200	2	100, 104	102%	NA
Mature Seed	Pen-3HB	0.010	7	95, 97, 96, 87, 90, 88, 92	92%	4%
		0.050	2	96, 98	97%	NA
		0.100	2	93, 90	91%	NA
		0.200	2	100, 94	97%	NA
	Penflufen	0.010	7	85, 83, 75, 94, 77, 75, 82	82%	7%
		0.050	2	93, 87	90%	NA
		0.100	2	90, 95	93%	NA
		0.200	2	95, 87	91%	NA
	Pen-HGT	0.010	7	85, 116, 104, 98, 86, 78, 73	92%	15%
		0.050	2	93, 70	82%	NA
		0.100	2	97, 86	91%	NA
		0.200	2	84, 88	86%	NA

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, and Pen-HGT are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of the freezer storage stability study will provide more information for dry bean seed, as well as the other matrices, when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.5.3-14.

Table 6.5.3-14 Summary of Storage Conditions for Soybean grain

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C)^a	Actual Study Duration (days)^b	Limit of Demonstrated Storage Stability (days)^c
Penflufen, Pen-3HB, and Pen-HGT	Soybean forage	< 0 °C	440	270
	Soybean hay	< 0 °C	410	264
Penflufen, Pen-3HB, and Pen-HGT	Shelled immature Seed	< 0 °C	390	273
	Podded immature Seed	< 0 °C	386	273
Penflufen, Pen-3HB, and Pen-HGT	Mature Soybean Seed	< 0 °C	359	273

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KHA 6.1.1/02, MRID No. 48023721.

Findings

The control samples were analyzed concurrently with the treated samples. The results of the analysis indicated that there were no apparent residues in the control soybean matrices above the LOQ (0.010 ppm) for any analyte. The BYF14182 residue data are summarized in Table 6.5.3-15.

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Table 6.5.3-15 Soybean Residue Data from the 5X Field Trials with Penflufen.

Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	PHI	Penflufen-HGT	Penflufen-3HB	Penflufen
Forage													
Sycamore, GA	01-08H	Soybean	2008	2	TRTD	Prichard RR	Forage	20.59	0.006 (0.007)	62	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	02-08H	Soybean	2008	5	TRTD	S060066	Forage	15.97	0.033 (0.037)	43	<0.01 <0.01 Average <0.01	0.0121 0.0108 Average 0.0115	<0.01 <0.01 Average <0.01
Springfield, NE	03-08H	Soybean	2008	5	TRTD	Stine 3128-4	Forage	17.19	0.013 (0.015)	46	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Hay													
Sycamore, GA	01-08H	Soybean	2008	2	TRTD	Prichard RR	Hay	84.87	0.006 (0.007)	101	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	02-08H	Soybean	2008	5	TRTD	S060066	Hay	39.70	0.033 (0.037)	75	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, NE	03-08H	Soybean	2008	5	TRTD	Stine 3128-4	Hay	45.00	0.013 (0.015)	83	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	PHI	Penflufen-HGT	Penflufen-3HB	Penflufen
Shelled Immature Seed													
Sycamore, GA	01-08H	Soybean	2008	2	TRTD	Prichard RR	Shelled immature seed	n/a	0.006 (0.007)	134	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	02-08H	Soybean	2008	5	TRTD	S060066	Shelled immature seed	n/a	0.033 (0.037)	91	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, NE	03-08H	Soybean	2008	5	TRTD	Stine 3128-4	Shelled immature seed	n/a	0.013 (0.015)	106	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Podded Immature Seed													
Sycamore, GA	01-08H	Soybean	2008	2	TRTD	Prichard RR	Podded immature seed	n/a	0.006 (0.007)	134	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	02-08H	Soybean	2008	5	TRTD	S060066	Podded immature seed	n/a	0.033 (0.037)	91	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, NE	03-08H	Soybean	2008	5	TRTD	Stine 3128-4	Podded immature seed	n/a	0.013 (0.015)	106	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

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Location (City, State)	Trial Number	Crop	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Lb ai/A (kg ai/ha) Total Rate ^a	PHI	Penflufen-HGT	Penflufen-3HB	Penflufen
Mature Seed													
Sycamore, GA	01-08H	Soybean	2008	2	TRTD	Prichard RR	Mature Seed	92.26	0.006 (0.007)	174	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Rockwood, ON	02-08H	Soybean	2008	5	TRTD	S060066	Mature Seed	90.10	0.033 (0.037)	118	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01
Springfield, NE	03-08H	Soybean	2008	5	TRTD	Stine 3128-4	Mature Seed	89.00	0.013 (0.015)	131	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01	<0.01 <0.01 Average <0.01

Conclusions:

No quantifiable residues of BYF 14182 or its metabolites were observed in mature soybeans or the immature podded or shelled beans harvested from the three soybean trials. No quantifiable residues of BYF 14182 or its metabolites were observed in soybean hay. There were no quantifiable residues of BYF 14182 or its metabolites in forage in two of three trials and the average residue of one metabolite in one trial was approximately 0.01 ppm, the method LOQ.

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.

B.7.7.2.3 Potato Processing Study

Report:	KIIA 6.5.3/04; Lenz, C.; 2010; M-364901-01-1
Title:	BYF 14182 FS240 – Magnitude of the Residue in/on Potato Processed Commodities
Report No.	RAELP044
Document No.:	M-364901-01-1
	MRID No. 48023737
	PMRA No. 1886007
Guidelines	US EPA Residue Chemistry Test Guideline OCSPP 860.1520, Processed Food/Feed
	PMRA Residue Chemistry Guidelines DIR98-02: Section 10 Processed Food/Feed
GLP	Yes (certified laboratory)
Acceptability	Study is scientifically acceptable

Executive Summary

Bayer CropScience has conducted a processing study to address the potential for residues of penflufen (BYF 14182) and its metabolites, Pen-3HB (BYF 14182 3-hydroxy butyl), Pen-HGT (BYF 14182 homoglutathione), Pen-PCX (BYF 14182-pyrazole-4-carboxamide), and Pen-D3C (BYF 14182-bis-desmethyl-3-carboxylic acid) to concentrate in processed potato commodities. To provide potato samples for the study, a potato field trial was conducted in the United States in 2008. Potatoes were grown from

potato seed pieces that had been treated with penflufen at a rate of at 10 g ai/100 kg seed, followed by an in-furrow application of penflufen at 0.526 kg ai/ha (0.469 lb ai/A). Based on the seed rate, the total application rate for the trial was 0.796 kg/ai/ha (0.710 lb ai/A), which is 5X the currently proposed application rate. Potato tubers were processed into potato wet peel, potato flakes and potato chips simulating as closely as possible commercial practices.

The residues of penflufen (BYF 14182) and its metabolites were quantitated by high pressure liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using stable isotopically labeled internal standards. The method limit of quantitation (LOQ) for penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C was 0.01 ppm for all analytes in potato tubers.

All residues of penflufen and its metabolite Pen-3HB were less than the LOQ (<0.01 ppm) in potato tubers, but were above the method limit of detection (LOD). Residues of Pen-HGT, Pen-PCX and Pen-D3C were not detectable in potato tubers (<LOD) and all processed commodities. Quantifiable residues of penflufen (average 0.0338 ppm) were seen in potato wet peel. Residues of penflufen in flakes and chips were <LOD. Residues of Pen-3HB were below the LOQ, but above the LOD in all processed commodities.

The Agency concludes that residues of the parent compound do not appear to concentrate in potato flakes or chips, but may concentrate in potato peel at up to 4X. Residues of the metabolite, Pen-3HB do not appear to concentrate in potato wet peel or potato chips, but may concentrate up to 2X in potato flakes. Since residues of all other metabolites were <LOD in both the tubers and processed commodities, no statement on potential concentration for these compounds can be made.

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this processing study is considered scientifically acceptable.

Potato Field Trial and Processing Study

Material and Methods

One field trial was conducted with PENRED 240FS (BYF 14182 240FS Red) in the United States in 2008. The site was representative of the areas in which potatoes are commonly grown. The potatoes were grown under typical climatic conditions and agricultural practices for potatoes. PENRED 240FS is a flowable suspension formulation containing the fungicide Penflufen (BYF 14182) at a concentration of 240 g ai/L. PENRED 240FS is being proposed for seed treatment for potatoes at 2 g ai/100 kg seed potato followed by an in-furrow application at planting, for a maximum seasonal application of 0.143 lb ai/A (160g ai/ha) for the control of fungal pests.

A seed piece treatment with PENRED 240FS was made to potato seed pieces at a target rate of 10 g ai/100 kg to potato seed pieces. Potato seed pieces were planted at the maximum density according to normal commercial practice for the trial region (2700 kg seed/ha). The resulting soil loading rate was 0.241 lb ai/A (0.27 kg ai/ha). At the time of planting, a single in-furrow application directed to the seed pieces was also made with PENRED 240FS at a rate of 0.469 lb ai/A (0.526 kg ai/ha). This resulted in a total application rate of 0.710 lb ai/A (0.796 kg ai/ha). This rate is approximately five times the total maximum proposed label rate for seed treatment in potatoes. The GAP used for this study in North America is summarized in Table 6.5.3-16.

Table 6.5.3-16 Study Use Pattern for BYF 14182 in Potato.

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application							Tank Mix Adjuvants
				Method ^{a,b}	Timing ^c	Plot Name	Rate lb a.i./A (kg a.i./ha)	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Payette, ID Region 11	EL007-08PA	2008	BYF 14182 FS240	Seed Piece Treatment	NA	TRT5X	0.241 (0.27)	NA ^d	NA ^d	0.71 (0.796)	None
			BYF 14182 FS240	In-furrow Spray	NA		0.469 (0.526)	NA ^d	15 (140)		None

^a Potato seed pieces treated with PENRED 240FS at a rate of 10 g ai/100 kg seed were planted at a density of 2700 kg seed/ha resulting in a soil loading rate of 0.241 lb ai/A (0.27 kg ai/ha).

^b In-furrow spray was applied at planting at a 5X rate of 0.469 lb ai/A (0.526 kg ai/ha).

^c Timing of application was at planting of the treated seed.

^d NA = Not applicable

A single composite sample, from both treated and untreated plots, of potatoes (bulk) was collected at ECH, BBCH 49, maximum tuber size reached, skin set complete. The potato (bulk) samples were shipped at ambient temperature to the processing facility.

The bulk samples were received at the processing at ambient temperature and placed into storage. Shortly after, the control and treated potatoes were processed into the commodities of wet peel, flakes, and chips. The potato tuber RAC and processed commodities were stored frozen until samples were shipped frozen on dry ice to analytical facility

The BYF 14182-derived residues were quantitated by high performance liquid chromatography-electrospray ionization / tandem mass spectrometry (LC-MS/MS) using isotopically labeled internal standards (Method EL-002-P09-01). The limit of quantitation (LOQ) is 0.01 ppm for each analyte. Recovery of penflufen from potato

commodities was measured concurrently with the set of samples to verify method performance. Individual recoveries at fortification levels between 0.01 and 0.10 mg/kg penflufen (BYF 14182), Pen-3HB (BYF 14182 3-hydroxy butyl, BCS-AA10006), Pen-HGT (BYF 14182 homoglutathione, BCS-AA10790), Pen-PCX (BYF 14182-pyrazole-4-carboxamide, BCS-AA10791), and Pen-D3C (BYF 14182-bis-desmethyl-3-carboxylic acid, BCS-CM41431) were within the acceptable range of 70-120%, as shown in Table 6.5.3-17. These results in addition to the recoveries obtained in the potato field study demonstrated acceptable method performance during sample analysis.

Table 6.5.3-17 Summary of Concurrent Recoveries of Penflufen (BYF 14182), Pen-3HB, and Pen-HGT, Pen-PCX, and PenD3C from Potatoes and Potato Processed Commodities.

Matrix	Analyte	Spike Level (mg/kg)	Sample Size (n)	Recoveries (%)	Mean ± Std. Dev. (%)
Potato Tuber (RAC)	Penflufen	0.010	1	114	NA
		0.100	1	85	
	Pen-3HB	0.010	1	98	
		0.100	1	92	
	Pen-HGT	0.010	1	81	
		0.100	1	83	
	Pen-PCX	0.010	1	95	
		0.100	1	97	
	Pen-D3C	0.010	1	96	
		0.100	1	84	
Potato Wet Peel	Penflufen	0.010	1	80	
		0.100	1	114	
	Pen-3HB	0.010	1	96	
		0.100	1	94	
	Pen-HGT	0.010	1	83	
		0.100	1	99	
	Pen-PCX	0.010	1	88	
		0.100	1	97	
	Pen-D3C	0.010	1	79	
		0.100	1	110	

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Matrix	Analyte	Spike Level (mg/kg)	Sample Size (n)	Recoveries (%)	Mean ± Std. Dev. (%)
Potato Flakes	Penflufen	0.010	1	78	NA
		0.100	1	83	
	Pen-3HB	0.010	1	93	
		0.100	1	98	
	Pen-HGT	0.010	1	70	
		0.100	1	90	
	Pen-PCX	0.010	1	90	
		0.100	1	105	
	Pen-D3C	0.010	1	77	
		0.100	1	87	
Potato Chips	Penflufen	0.010	1	104	
		0.100	1	89	
	Pen-3HB	0.010	1	89	
		0.100	1	94	
	Pen-HGT	0.010	1	81	
		0.100	1	90	
	Pen-PCX	0.010	1	86	
		0.100	1	110	
	Pen-D3C	0.010	1	79	
		0.100	1	81	

NA is not applicable.

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in Table 6.5.3-18.

Table 6.5.3-18 Summary of Storage Conditions for Potatoes and Potato Processed Commodities

Residue Component(s)	Matrix (RAC)	Average Storage Temperature (°C) ^a	Actual Study Duration (days) ^b	Limit of Demonstrated Storage Stability (days) ^c
BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Potato Tuber (RAC)	<0°C	479	270
BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Potato Wet Peel	<0°C	485	270
BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Potato Flakes	<0°C	477	270
BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Potato Chips	<0°C	477	270

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KHIA 6.1.1/02.

Findings

The control samples were analyzed concurrently with the treated samples. The results of the analysis indicated that there were no apparent residues in the control potatoes above the LOQ (0.010 ppm) for any analyte. The penflufen residue data are summarized in Table 6.5.3-19.

Table 6.5.3-19 Residue Data from the Potato Processing Study with PENRED 240FS

Trial Number	RAC	Processed Commodity	Total Rate Lb ai/A (kg ai/ha)	PHI (Pre-Harvest Interval; (days) ^a	BYF 14182 Residue (ppm) ^b	Pen-3HB Residue (ppm) ^b	Pen-HGT Residue (ppm) ^b	Pen-PCX Residue (ppm) ^b	Pen-D3C Residue (ppm) ^b
EL007-08PA	Potato Tuber	NA ^d	0.71 (0.796)	ECH (150)	0.0077	0.0033	<LOD ^e	<LOD ^e	<LOD ^e
					0.0088	0.0033	<LOD ^e	<LOD ^e	<LOD ^e
					0.0078	0.0030	<LOD ^e	<LOD ^e	<LOD ^e
					Avg. 0.0081	Avg. 0.0032			
		Potato Wet Peel	NA ^d	NA ^d	0.0318	0.0025	<LOD ^e	<LOD ^e	<LOD ^e
					0.0278	0.0025	<LOD ^e	<LOD ^e	<LOD ^e
					0.0419	0.0036	<LOD ^e	<LOD ^e	<LOD ^e
					Avg. 0.0338	Avg. 0.0029			
		Potato Flakes	NA ^d	NA ^d	<LOD ^e	0.0067	<LOD ^e	<LOD ^e	<LOD ^e
					<LOD ^e	0.0059	<LOD ^e	<LOD ^e	<LOD ^e
					<LOD ^e	0.0065	<LOD ^e	<LOD ^e	<LOD ^e
						Avg. 0.0064			
		Potato Chips	NA ^d	NA ^d	<LOD ^e	0.0031	<LOD ^e	<LOD ^e	<LOD ^e
					<LOD ^e	0.0030	<LOD ^e	<LOD ^e	<LOD ^e
					<LOD ^e	0.0028	<LOD ^e	<LOD ^e	<LOD ^e
						Avg. 0.0030			

^a PHI = Earliest commercial harvest.

^b Data reported even when results are <the LOQ of the method (0.01 ppm)

^c Penflufen Processing Factor = Average Penflufen Residue in the processed commodity sample divided by the Average Penflufen Residue in the unprocessed sample (potato tuber RAC).

^d NA = Not Applicable.

^e LOD = Limit of Detection – no discernible residue in the sample.

Conclusions

All residues of penflufen and its metabolite, Pen -3HB were less than the LOQ (<0.01 ppm) in potato tubers, but were above the method limit of detection (LOD). Residues of Pen-HGT, Pen-PCX and Pen-D3C were not detectable in potato tubers (<LOD) and all processed commodities. Quantifiable residues of penflufen (average 0.0338 ppm) were seen in potato wet peel. Residues of penflufen in flakes and chips were <LOD. Residues of Pen-3HB were below the LOQ, but above the LOD were seen in all processed commodities.

The Agency concludes that residues of the parent compound do not appear to concentrate in potato flakes or chips, but may concentrate in potato peel at up to 4X. Residues of the metabolite, Pen-3HB do not appear to concentrate in potato wet peel or potato chips, but may concentrate up to 2X in potato flakes. Since residues of all other metabolites were

<LOD in both the tubers and processed commodities, no statement on potential concentration for these compounds can be made.

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. Processing simulated as closely as possible commercial practices. The residue data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this processing study is considered scientifically acceptable.

B.7.9.2. Field Rotational Residues

Report:	KIIA 6.6.3/01; Beedle, E.C., Harbin A. M.; 2010; M-364937-01-1
Title:	BYF 14182 FS240 – Magnitude of the Residue in Field Rotational Crops (Limited Rotational Crops – Wheat, Mustard Greens, Turnips)
Report No.	RAELP004
Document No.:	M-364937-01-1
	MRID No. 48023741
	PMRA No. 1886005
Guidelines	US EPA Residue Chemistry Test Guidelines OCSPP 860.1900, Field Accumulation in Rotational Crops PMRA Residue Chemistry Guidelines DIR98-02: Section 14 Field Accumulation in Rotational Crops
GLP	Yes (certified laboratory); Deviations: None
Acceptability	Study is scientifically acceptable

Executive Summary

Eighteen field rotational crop trials, six wheat, six turnip, and six mustard green trials were conducted in North America in 2008 to measure the magnitude of penflufen {BYF 14182, {N-[2-(1,3-dimethylbutyl) phenyl]-5-fluoro-1,3-dimethyl-1*H*-pyrazole-4-carboxamide} residues in rotational crops. The crops were planted at three plant-back intervals (1, 6 or 12-month PBIs) following a primary crop of potatoes grown from either treated seed pieces (2 g active ingredient (ai)/100 kg seed) or treated seed pieces (2 g ai/100 kg seed) and in-furrow treatment (80 g ai/ha). Seeds were sown at a rate of 4000 kg seed/ha for an application rate of 80 g ai/ha (0.071 lb ai/A) for the treated seeds or 160 g ai/ha (0.142 lb ai/A) for the combined treated seed pieces and in-furrow application.

Residues of BYF 14182 (penflufen) and its metabolites BYF 14182 3-hydroxy butyl (Pen-3HB), BYF 14182 homoglutathione (Pen-HGT), BYF 14182-pyrazole-4-carboxamide (Pen-PCX), and BYF 14182 bis-desmethyl-3-carboxylic acid (Pen-D3C) were quantitated by high pressure liquid chromatography/triple stage quadrupole mass spectrometry (LC/MS/MS) using the stable isotopically labeled analog of each analyte as an internal standard. The limit of quantitation (LOQ) was 0.01 ppm for each analyte in all matrices.

In wheat, no residues of penflufen or its metabolites greater than the LOQ (0.01 ppm) were observed in wheat grain at any PBI at either rate (80 g ai/ha or 160 aig/ha). In plots treated at rates ranging from 78 to 80 g BYF 14182/ha, residues of Pen-3HB were observed in at the 1-month (0.02 ppm) and 6-month PBI (0.01 ppm), in hay at the 1-month (0.03 ppm) and 6-month PBI (0.01 ppm), and in straw at the 1-month PBI (0.01 ppm). In plots treated at rates ranging from 154 to 161 g BYF 14182/ha, maximum residues of Pen-3HB were observed in forage at the 1-month (0.04 ppm) and 6-month PBI (0.01 ppm), in hay at all PBIs (1-month, 0.03 ppm; 6-month, 0.03 ppm; and 12-month, 0.03 ppm), and in straw at the 1-month PBI (0.02 ppm). No residues of BYF 14182, Pen-HGT, or Pen-PCX were observed in any wheat matrix at any PBI from either treatment pattern.

In turnips, no residues of penflufen or its metabolites greater than the LOQ (0.01 ppm) were observed in the roots at any PBI. In turnips treated at rates ranging from 159 to 161 g BYF 14182/ha, a maximum Pen-3HB residue of 0.04 ppm occurred in tops at the 1-month PBI and no residues were observed in the subsequent PBI. In turnips treated at rates ranging from 79 to 81 g BYF 14182/ha, a Pen-3HB residue of 0.03 ppm occurred in tops at the 1-month PBI; samples from roots were not analyzed based on the results of the high-rate application pattern.. No residues of BYF 14182, Pen-HGT, or Pen-PCX were observed in turnip tops or roots at any PBI from either treatment pattern.

In mustard greens, residues of Pen-3HB were observed at all PBIs from both treatment patterns. A maximum Pen-3HB residue of 0.18 ppm, likely an outlier, was observed at the 1-month PBI in mustard greens treated at rates ranging from 158 to 162 g BYF 14182/ha. Maximum Pen-3HB residues were much lower in samples from the later 6-month and 12-month PBIs (0.03 ppm and 0.02 ppm, respectively). Additionally, residues of Pen-D3C were observed at the 1-month (0.02 ppm), 6-month (0.03 ppm), and 12-month PBIs (0.04 ppm). In mustard greens treated at rates ranging from 79 to 80 g BYF 14182/ha, residues of Pen-3HB were 0.05 ppm at the 1-month PBI, 0.03 ppm at the 6-month PBI, and 0.01 ppm at the 12-month PBI. Pen-D3C residue was found only at the 12-month PBI (0.03 ppm). No residues of BYF 14182, Pen-HGT, or Pen-PCX were observed in mustard greens at any PBI from either treatment pattern.

Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the additional storage stability data demonstrates that penflufen and its

metabolites, are stable for the full scheduled duration of the study, this rotational field study is considered scientifically acceptable.

Rotational Crop Field Trials

Material and methods

The crops were planted at three plant-back intervals (PBI) after two different potato treatment regimes: in nine of the trials, potato seed pieces were treated with PENRED 240FS at a target rate of 2 g ai/100 kg seed piece, and in the other nine trials potato seed pieces were treated at a target rate of 2 g ai/100 kg seed piece followed by an in-furrow treatment of PENRED 240FS at a target rate of 80 g ai/ha. In each of the two application patterns, the treated potato seed pieces were planted at a target seeding rate of 4,000 kg seeds/ha. The resulting target soil application rate for the seed treatment only (low rate) was 80 g BYF 14182/ha (0.071 lb BYF 14182/A) (actual rates ranging from 78 to 81 g BYF 14182/ha or 0.069 to 0.073 lb BYF 14182/A). The resulting total target application rate for the seed treatment plus in-furrow treatment (high rate) was 160 g BYF 14182/ha (0.142 lb BYF 14182/A) (actual rates ranging from 154 to 161 g BYF 4182/ha or 0.137 to 0.143 lb BYF 14182/A). PENRED 240FS is a flowable concentrate containing 240 g penflufen per liter of formulation. Either 1 month (23 to 31 days), 6 months (159 to 189 days), or 12 months (348 to 367 days) after the planting of the treated potato seed pieces (and in-furrow application for nine of the trials), the seedbed was prepared and a rotational crop of either mustard greens (a leafy vegetable), turnips (a root crop), or wheat (a cereal grain) was planted.

The trial site conditions, including soil characteristics, are listed in Table 6.6.3-1

For each representative crop (mustard greens, turnips, and wheat), rotational crop trials using the two application patterns (low or high rate) at three nominal plant-back intervals of 1 month, 6 months, and 12 months were conducted at each of three locations for a total of 18 trials. Each trial contained a control plot and a treated plot for each of the three plant back intervals for a total of six plots for each trial. Agronomic practices typical for growing each rotational crop were used for growing each of the rotational crops. Details of the study use patterns are given in Table 6.6.3-2.

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Table 6.6.3-1 Trial site conditions for rotational crops planted after treatment (potato seed piece or potato seed piece/in furrow) with BYF 14182.

Study Location (City, State)	Trial Number	Year	Soil Characteristics ^a				Meteorological Data ^b	
			Type	% OM	pH	CEC	Total Rainfall (in)	Temp. Range (°F)
Rotational Wheat Study RAELP004 (Potato Seed Treatment)								
Arkansaw, WI	EL001-08RA	2008	Sandy Loam	2.0	6.7	8.0	36.48	-4-83
Springfield, NE	EL002-08RA	2008	Silt Loam	2.1	7.1	12.7	54.81	10-85
Ephrata, WA	EL003-08RA	2008	Loamy Sand	0.7	8.0	9.5	4.79	15-90
Rotational Wheat Study RAELP005 (Potato Seed Treatment plus In-Furrow Treatment)								
Arkansaw, WI	EL004-08RA	2008	Sandy Loam	2.0	6.7	8.0	36.48	-4-83
Springfield, NE	EL005-08RA	2008	Silt Loam	2.1	7.1	12.7	57.79	10-85
Ephrata, WA	EL006-08RA	2008	Loamy Sand	0.7	8.0	9.5	4.79	15-90
Rotational Turnip Study RAELP066 (Potato Seed Treatment)								
Athens, GA	EL076-08RA	2008	Sandy Clay Loam	1.2	6.0	7.3	77.81	32-92
Gardner, KS	EL077-08RA	2008	Silt Loam	1.8	5.8	16.8	58.23	16-88
Uvalde, TX	EL078-08RA	2008	Sandy Clay Loam	2.2	7.9	23.3	13.17	39-102
Rotational Mustard Green Study RAELP067 (Potato Seed Treatment)								
Suffolk, VA	EL079-08RA	2008	Sandy Loam	1.6	5.5	4.2	27.03	34-92
Gardner, KS	EL080-08RA	2008	Silt Loam	1.8	5.8	16.8	58.23	16-88
East Bernard, TX	EL081-08RA	2008	Sandy Loam	1.0	6.3	4.3	34.37	38-99
Rotational Turnip Study RAELP068 (Potato Seed Treatment plus In-Furrow Treatment)								
Athens, GA	EL082-08RA	2008	Sandy Clay Loam	1.2	6.0	7.3	77.81	32-92
Gardner, KS	EL083-08RA	2008	Silt Loam	1.8	5.8	16.8	58.23	16-88
Uvalde, TX	EL084-08RA	2008	Sandy Clay Loam	2.2	7.9	23.3	13.17	39-102
Rotational Mustard Green Study RAELP069 (Potato Seed Treatment plus In-Furrow Treatment)								
Suffolk, VA	EL085-08RA	2008	Sandy Loam	1.6	5.5	4.2	27.03	34-92
Gardner, KS	EL086-08RA	2008	Silt Loam	1.8	5.8	16.8	58.23	16-88
East Bernard, TX	EL087-08RA	2008	Sandy Loam	1.0	6.3	4.3	34.37	38-99

^a Abbreviations are as follows % OM = Percent Organic Matter, CEC = cation exchange capacity in meq/100 g soil..

^b Data is for the interval of month of first application through month of last sampling.

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Table 6.6.3-2 Study use pattern for BYF 14182 FS240 prior to planting rotational crops wheat, turnips, and mustard greens.

Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application ^{a,b}							Tank Mix Adjuvants
				Method	Timing	Plot Name	Rate lb a.i./A (kg a.i./ha) ^b	Retreatment Interval(days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Wheat Rotational Crop (Study RAELP004)											
Arkansas, Wisconsin Region 5	EL001-08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TWL1	0.069 (0.078)	NA	NA	0.069 (0.078)	None
				Seed Treatment	NA	TWL6	0.069 (0.078)	NA	NA	0.069 (0.078)	None
				Seed Treatment	NA	TWL12	0.069 (0.078)	NA	NA	0.069 (0.078)	None
Springfield, Nebraska Region 5	EL002-08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TWL1	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TWL6	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TWL12	0.071 (0.080)	NA	NA	0.071 (0.080)	None
Ephrata, Washington Region 11	EL003-08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TWL1	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TWL6	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TWL12	0.071 (0.080)	NA	NA	0.071 (0.080)	None
Wheat Rotational Crop (Study RAELP005)											
Arkansas, Wisconsin Region 5	EL004-08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TWH1	0.069 (0.078)	NA	NA	0.137 (0.154)	None
				In-furrow	At planting		0.068 (0.076)	NA	16 (148)		None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application ^{a,b}							Tank Mix Adjuvants
				Method	Timing	Plot Name	Rate lb a.i./A (kg a.i./ha) ^b	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
				Spray	g))		
				Seed Treatme nt	NA	TWH 6	0.069 (0.078)	NA	NA	0.140 (0.157)	None
				In- furrow Spray	At plantin g		0.071 (0.080)	NA	17 (154)		None
				Seed Treatme nt	NA	TWH 12	0.069 (0.078)	NA	NA	0.138 (0.155)	None
				In- furrow Spray	At plantin g		0.069 (0.077)	NA	16 (150)		None
Springfield, Nebraska Region 5	EL005 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TWH1	0.071 (0.080)	NA	NA	0.143 (0.161)	None
				In-furrow Spray	At planting		0.072 (0.080)	NA	11 (99)		None
				Seed Treatment	NA	TWH6	0.071 (0.080)	NA	NA	0.140 (0.158)	None
				In-furrow Spray	At planting		0.069 (0.078)	NA	10 (94)		None
				Seed Treatment	NA	TWH12	0.071 (0.080)	NA	NA	0.142 (0.160)	None
				In-furrow Spray	At planting		0.071 (0.079)	NA	10 (95)		None
Ephrata, Washington Region 11	EL006 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TWH1	0.071 (0.080)	NA	NA	0.142 (0.160)	None
				In-furrow Spray	At planting		0.071 (0.080)	NA	15 (143)		None
				Seed Treatment	NA	TWH6	0.071 (0.080)	NA	NA	0.142 (0.160)	None
				In-furrow Spray	At planting		0.071 (0.080)	NA	15 (142)		None
				Seed Treatment	NA	TWH12	0.071 (0.080)	NA	NA	0.142 (0.160)	None
				In-furrow Spray	At planting		0.071 (0.080)	NA	15 (143)		None
Mustard Greens Rotational Crop (Study RAELP067)											
Suffolk, VA Region 2	EL079 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TWL1	0.071 (0.080)	NA	NA	0.071 (0.080)	None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application ^{a,b}							Tank Mix Adjuvants
				Method	Timing	Plot Name	Rate lb a.i./A (kg a.i./ha) ^b	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
				Seed Treatment	NA	TWL6	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TWL12	0.071 (0.080)	NA	NA	0.071 (0.080)	None
Gardner, Kansas Region 5	EL080 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TML1	0.071 (0.079)	NA	NA	0.071 (0.079)	None
				Seed Treatment	NA	TML6	0.071 (0.079)	NA	NA	0.071 (0.079)	None
				Seed Treatment	NA	TML12	0.071 (0.079)	NA	NA	0.071 (0.079)	None
East Bernard, Texas Region 6	EL081 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TML1	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TML6	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TML12	0.071 (0.080)	NA	NA	0.071 (0.080)	None
Mustard Greens Rotational Crop (Study RAELP069)											
Suffolk, VA Region 2	EL085 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TMH1	0.071 (0.080)	NA	NA	0.144 (0.162)	None
				In-furrow Spray	At planting		0.073 (0.082)	NA	6 (55)		None
				Seed Treatment	NA	TMH6	0.071 (0.080)	NA	NA	0.144 (0.162)	None
				In-furrow Spray	At planting		0.073 (0.082)	NA	6 (55)		None
				Seed Treatment	NA	TMH12	0.071 (0.080)	NA	NA	0.144 (0.162)	None
				In-furrow Spray	At planting		0.073 (0.082)	NA	6 (55)		None
Gardner, KS Region 5	EL086 -08RA	2008	BYF 14182 FS240 BYF 14182 FS240	Seed Treatment	NA	TMH1	0.071 (0.079)	0	NA	0.142 (0.159)	None
				In-furrow Spray	At planting		0.071 (0.080)	0	10 (95)		None
				Seed Treatment	NA	TMH6	0.071 (0.079)	0	NA	0.143 (0.161)	None
				In-furrow Spray	At planting		0.073 (0.082)	0	12 (109)		None
				Seed Treatment	NA	TMH12	0.071 (0.079)	0	NA	0.141 (0.158)	None
				In-furrow Spray	At planting		0.071 (0.079)	0	11 (100)		None
East Bernard, TX	EL087 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TMH1	0.071 (0.080)	0	NA	0.143 (0.160)	None

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Location (City, State, and NAFTA Region)	Trial Number	Year	End-use Product (Formulation)	Application ^{a,b}							Tank Mix Adjuvants
				Method	Timing	Plot Name	Rate lb a.i./A (kg a.i./ha) ^b	Retreatment Interval (days)	Actual Spray Volume GPA (L/ha)	Total Rate lb a.i./A (kg a.i./ha)	
Region 6				In-furrow Spray	At planting		0.071 (0.080)	0	9 (87)		None
				Seed Treatment	NA	TMH6	0.071 (0.080)	0	NA	0.142 (0.159)	None
				In-furrow Spray	At planting		0.070 (0.079)	0	9 (86)		None
				Seed Treatment	NA	TMH12	0.071 (0.080)	0	NA	0.142 (0.160)	None
				In-furrow Spray	At planting		0.071 (0.080)	0	9 (87)		None
Turnip Rotational Crop (Study RAELP066)											
Athens, GA Region 2	EL076 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TTL1	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TTL6	0.071 (0.080)	NA	NA	0.071 (0.080)	None
				Seed Treatment	NA	TTL12	0.071 (0.080)	NA	NA	0.071 (0.080)	None
Gardner, KS Region 5	EL077 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TTL1	0.071 (0.079)	NA	NA	0.071 (0.079)	None
				Seed Treatment	NA	TTL6	0.071 (0.079)	NA	NA	0.071 (0.079)	None
				Seed Treatment	NA	TTL12	0.071 (0.079)	NA	NA	0.071 (0.079)	None
Uvalde, TX Region 6	EL078 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TTL1	0.073 (0.081)	NA	NA	0.073 (0.081)	None
				Seed Treatment	NA	TTL6	0.073 (0.081)	NA	NA	0.073 (0.081)	None
				Seed Treatment	NA	TTL12	0.073 (0.081)	NA	NA	0.073 (0.081)	None
Turnip Rotational Crop (Study RAELP068)											
Athens, GA Region 2	EL082 -08RA	2008	BYF 14182 FS240	Seed Treatment	NA	TTH1	0.071 (0.080)	NA	NA	0.143 (0.161)	None
				In-furrow Spray	At planting		0.072 (0.081)	NA	14 (129)		None
				Seed Treatment	NA	TTH6	0.071 (0.080)	NA	NA	0.143 (0.160)	None
				In-furrow Spray	At planting		0.071 (0.080)	NA	14 (128)		None
				Seed Treatment	NA	TTH12	0.071 (0.080)	NA	NA	0.142 (0.159)	None
				In-furrow Spray	At planting		0.071 (0.079)	NA	14 (127)		None

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^a NA = Not applicable. Retreatment Interval was not applicable; in-furrow spray and/or seed treatment applications were made at planting of potato seed pieces. Spray volume and tank mix adjuvants are not applicable for seed treatment application.

^b Potato seed pieces treated with PENRED 240FS at a target rate of 2 g ai/100 kg seed piece were planted in each plot, and at nominal intervals of 1, 6, or 12 months following planting the seedbed was prepared and a rotational crop of either mustard greens, turnips, or wheat was planted.

Findings

Sample homogenization, percent dry matter determination, sample analysis, and report preparation were performed at the Bayer Research Park (BRP) located in Stilwell, KS. Samples were extracted and analyzed with method EL-002-P09-01. Recovery samples were analyzed with each set of samples. Mean recoveries at fortification levels between 0.01 and 0.20 mg/kg BYF 14182 (penflufen), Pen-3HB (BYF 14182 3-hydroxy butyl, BCS-AA10006, free and conjugated), Pen-HGT (BYF 14182 homogluthathione, glutathione adduct; BCS-AA10790), Pen-PCX (BYF 14182-pyrazole-4-carboxamide, BCS-AA10791), and Pen-D3C (BYF 14182 bis-desmethyl-3-carboxylic acid; BCS-CM41431) were within the acceptable range of 70-110%, SD <20% as shown in Table 6.6.3-3. All results of the method validation are in accordance with the general requirements for residue analytical methods, therefore the method was validated successfully.

Table 6.6.3-3 Summary of recoveries of penflufen (BYF 14182), Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C from rotational crops.

Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean Recovery %	Standard Deviation %
Wheat Forage (RAELP004)	BYF 14182	0.01	4	94, 89, 101, 85	92	7
		0.10	5	92, 106, 87, 79, 96	92	10
	Pen-3HB	0.01	4	108, 108, 90, 100	102	8
		0.10	5	103, 103, 93, 84, 104	97	9
	Pen-HGT	0.01	4	85, 98, 81, 90	88	8
		0.10	5	99, 97, 90, 83, 99	93	7
	Pen-PCX	0.01	4	81, 81, 120, 70	88	22
		0.10	5	119, 117, 91, 74, 115	103	20
	Pen-D3C	0.01	3	71, 75, 96	81	14
		0.10	4	109, 83, 71, 93	88	19
Wheat Forage (RAELP005)	BYF 14182	0.01	9	91, 115, 99, 78, 72, 85, 76, 89, 74	87	14
		0.10	5	85, 99, 79, 110, 88	92	12
	Pen-3HB	0.01	9	89, 92, 91, 96, 76, 85, 85, 79, 86	87	6
		0.10	5	97, 97, 97, 94, 95	96	1
	Pen-HGT	0.01	9	98, 100, 108, 114, 86, 105, 112, 94, 93	101	9

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Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean Recovery %	Standard Deviation %
	Pen-PCX	0.10	5	101, 69, 90, 92, 93	89	12
		0.01	9	73, 91, 101, 119, 110, 95, 85, 83, 76	93	15
	Pen-D3C	0.10	5	117, 101, 101, 95, 86	100	11
		0.01	9	85, 73, 73, 118, 102, 74, 73, 70, 71	82	17
		0.10	5	95, 77, 93, 89, 94	90	7
Wheat Hay (RAELP004)	BYF 14182	0.01	3	87, 88, 73	83	9
		0.10	5	101, 89, 74, 84, 96	89	10
	Pen-3HB	0.01	3	100, 88, 80	89	10
		0.10	5	96, 89, 93, 77, 97	90	8
	Pen-HGT	0.01	3	79, 90, 89	86	6
		0.10	5	91, 100, 78, 77, 95	88	10
	Pen-PCX	0.01	3	75, 92, 72	80	11
		0.10	5	116, 82, 86, 87, 102	95	14
	Pen-D3C	0.01	3	76, 73, 76	75	2
		0.10	5	91, 88, 80, 71, 90	84	8
Wheat Hay (RAELP005)	BYF 14182	0.01	9	92, 89, 70, 103, 87, 70, 75, 73, 71	81	12
		0.10	5	94, 87, 101, 94, 103	96	7
	Pen-3HB	0.01	9	80, 81, 74, 112, 82, 83, 90, 84, 80	85	11
		0.10	5	92, 100, 96, 93, 102	97	4
	Pen-HGT	0.01	9	74, 78, 71, 119, 108, 73, 98, 87, 77	87	17
		0.10	5	101, 85, 85, 93, 99	93	8
	Pen-PCX	0.01	9	70, 71, 75, 75, 76, 103, 97, 71, 80	80	12
		0.10	5	82, 78, 87, 94, 98	88	8
	Pen-D3C	0.01	9	83, 75, 93, 91, 109, 77, 109, 102, 115	95	15
		0.10	5	80, 112, 94, 76, 79	88	15
Wheat Grain (RAELP004)	BYF 14182	0.01	2	81, 100	91	NA
		0.10	2	87, 92	90	
	Pen-3HB	0.01	2	103, 100	102	
		0.10	2	101, 83	92	
	Pen-HGT	0.01	2	114, 78	96	
		0.10	2	90, 77	83	
	Pen-PCX	0.01	2	78, 103	90	
		0.10	2	110, 88	99	
	Pen-D3C	0.01	1	73	NA	

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Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean Recovery %	Standard Deviation %
		0.10	2	75, 72	73	
Wheat Grain (RAELP005)	BYF 14182	0.01	7	98, 88, 84, 72, 93, 77, 94	87	10
		0.10	3	96, 98, 109	101	7
	Pen-3HB	0.01	7	93, 91, 90, 94, 101, 96, 96	94	4
		0.10	3	105, 105, 105	105	0
	Pen-HGT	0.01	7	79, 78, 101, 93, 72, 83, 73	83	11
		0.10	3	93, 88, 73	85	10
	Pen-PCX	0.01	7	102, 71, 72, 110, 73, 76, 89	85	16
		0.10	3	104, 99, 103	102	3
	Pen-D3C	0.01	7	92, 92, 93, 99, 83, 86, 102	92	7
		0.10	3	76, 84, 76	79	4
Wheat Straw (RAELP004)	BYF 14182	0.01	3	71, 104, 102	92	18
		0.10	3	109, 91, 88	96	12
	Pen-3HB	0.01	3	83, 84, 88	85	3
		0.10	3	95, 91, 80	88	8
	Pen-HGT	0.01	3	80, 75, 82	79	4
		0.10	3	84, 86, 74	81	7
	Pen-PCX	0.01	3	73, 86, 91	83	9
		0.10	3	96, 85, 74	85	11
	Pen-D3C	0.01	2	73, 73	73	NA
		0.10	3	82, 71, 71	75	NA
Wheat Straw (RAELP005)	BYF 14182	0.01	8	81, 80, 108, 85, 85, 87, 79, 80	86	9
		0.10	4	96, 79, 73, 95	86	11
	Pen-3HB	0.01	8	76, 79, 89, 94, 85, 100, 83, 81	86	8
		0.10	4	90, 96, 78, 99	91	9
	Pen-HGT	0.01	8	78, 96, 71, 98, 97, 76, 92, 80	86	11
		0.10	4	94, 120, 88, 92	98	15
	Pen-PCX	0.01	8	73, 74, 119, 101, 71, 84, 82, 77	85	17
		0.10	4	84, 84, 79, 89	84	4
	Pen-D3C	0.01	8	83, 79, 115, 84, 78, 83, 71, 97	86	14
		0.10	3	70, 114, 86	90	22

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Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean Recovery %	Standard Deviation %
Turnip Tops (RAELP066)	BYF 14182	0.01	2	102, 95	98	NA
		0.10	2	104, 96	100	
	Pen-3HB	0.01	2	98, 93	95	
		0.10	2	98, 101	99	
	Pen-HGT	0.01	2	120, 99	109	
		0.10	2	102, 96	99	
	Pen-PCX	0.01	2	83, 99	91	
		0.10	2	98, 113	105	
	Pen-D3C	0.01	2	75, 70	73	
		0.10	2	95, 83	89	
Turnip Tops (RAELP068)	BYF 14182	0.01	7	77, 81, 94, 89, 70, 81, 120	87	16
		0.10	3	91, 78, 104	91	13
	Pen-3HB	0.01	7	92, 88, 92, 96, 102, 98, 102	96	5
		0.10	3	95, 92, 103	97	5
	Pen-HGT	0.01	7	81, 95, 93, 96, 108, 89, 95	94	8
		0.10	3	96, 94, 93	94	1
	Pen-PCX	0.01	7	102, 119, 74, 94, 72, 91, 80	90	17
		0.10	3	118, 112, 100	110	9
	Pen-D3C	0.01	6	71, 77, 74, 85, 76, 76	77	5
		0.10	3	70, 78, 72	73	4
Turnip Roots (RAELP068)	BYF 14182	0.01	7	85, 89, 72, 77, 87, 78, 110	85	12
		0.10	3	84, 91, 76	83	7
	Pen-3HB	0.01	7	96, 90, 94, 95, 100, 96, 97	95	3
		0.10	3	100, 96, 93	96	4
	Pen-HGT	0.01	7	113, 107, 100, 101, 94, 100, 110	103	7
		0.10	3	103, 95, 101	100	5
	Pen-PCX	0.01	7	71, 112, 96, 96, 113, 114, 92	99	15
		0.10	3	93, 118, 112	108	13
	Pen-D3C	0.01	7	90, 74, 97, 79, 70, 90, 93	85	10
		0.10	3	70, 90, 85	82	10
Mustard	BYF 14182	0.01	2	81, 89	85	NA

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Crop Matrix	Analyte	Spike Level (ppm)	Sample Size (n)	Recoveries (%)	Mean Recovery %	Standard Deviation %
Greens (RAELP067)	Pen-3HB	0.10	3	90, 97, 81	89	8
		0.01	2	105, 98	102	NA
		0.10	3	99, 98, 97	98	1
	Pen-HGT	0.01	2	112, 105	108	NA
		0.10	3	84, 89, 91	88	4
	Pen-PCX	0.01	2	82, 72	77	NA
		0.10	3	79, 84, 100	88	11
	Pen-D3C	0.01	2	119, 78	98	NA
		0.10	3	76, 95, 91	87	10
Mustard Greens (RAELP069)	BYF 14182	0.01	8	97, 88, 110, 99, 80, 82, 109, 83	93	12
		0.10	6	94, 83, 115, 101, 89, 92	96	11
		0.20	3	86, 89, 105	93	10
	Pen-3HB	0.01	8	98, 106, 98, 90, 91, 93, 93, 102	97	5
		0.10	6	93, 88, 100, 104, 97, 96	96	6
		0.20	3	97, 104, 103	101	4
	Pen-HGT	0.01	8	100, 78, 72, 80, 96, 99, 91, 98	89	11
		0.10	6	86, 93, 88, 116, 89, 88	93	11
		0.20	3	81, 93, 75	83	9
	Pen-PCX	0.01	8	77, 101, 103, 103, 95, 89, 84, 100	94	10
		0.10	6	118, 113, 89, 103, 80, 91	99	15
		0.20	3	107, 108, 94	103	8
	Pen-D3C	0.01	8	73, 67, 111, 85, 79, 81, 70, 80	81	13
		0.10	6	106, 85, 73, 90, 83, 86	87	11
		0.20	3	99, 102, 103	102	2

A freezer storage stability study in progress (M-349051-01-2, MRID No. 48023721) indicates that residues of BYF 14182, Pen-3HB, Pen-HGT, Pen-PCX and Pen-D3C are stable during a nominal nine months of freezer storage in potato tuber, head lettuce, orange fruit, dry bean seed, wheat grain, wheat straw, and sunflower seed. The continuation of this study will provide more information when time intervals through 24 months are analyzed.

The storage periods are listed in the Table 6.6.3-4.

Residues of penflufen and its metabolites are summarized in Tables 6.6.3-5, 6.6.3-6 and 6.6.3-7.

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Table 6.6.3-4 Summary of Storage Conditions for BYF 14182 in Rotational Crops.

Residue Component(s)	Matrix (RAC)	Storage Temperature (°C)^a	Actual Study Duration (days)^b	Limit of Demonstrated Storage Stability (days)^c
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Wheat Forage	< 0°C	559	264
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Wheat Hay	< 0°C	539	264
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Wheat Grain	< 0°C	487	269
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Wheat Straw	< 0°C	487	264
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Turnip Tops	< 0°C	544	270
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Turnip Roots	< 0°C	502	277
Penflufen, Pen-3HB, Pen-HGT, Pen-PCX, and Pen-D3C	Mustard Greens	< 0°C	575	270

^a The storage temperature is from the time of sample receipt at the analytical facility until sample analysis. The reported storage temperature is a maximum value; storage temperatures were typically much lower (<-18°C). During preparation for sample analysis, the samples were maintained in a laboratory freezer.

^b The actual study duration is the time from field sampling (cutting for samples dried before sampling) through the last sample analysis.

^c From KIIA 6.1.1/02, MRID No. 48023721.

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Table 6.6.3-5 Residue data from wheat rotational crop field trials conducted with BYF 14182 FS240.

Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL1 (1 Mo PBI)	Howard Hard Red	Forage	21	0.069 (0.078)	41	31 (1)	<0.01 <0.01 Avg. <0.01	<0.01 0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		14	0.071 (0.080)	48	23 (1)	<0.01 <0.01 Avg. <0.01	<0.01 0.01 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003-08RA	Wheat	2008	11		Sunstar 50-30		19	0.071 (0.080)	33	30 (1)	<0.01 <0.01 Avg. <0.01	0.01 0.02 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL6 (6 Mo PBI)	Pioneer 25R47	Forage	30	0.069 (0.078)	247	159 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		13	0.071 (0.080)	48	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003-08RA	Wheat	2008	11		Stephens		20	0.071 (0.080)	185	180 (6)	<0.01 <0.01 Avg. <0.01	0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL12 (12 Mo PBI)	Briggs HRS	Forage	18	0.069 (0.078)	50	356 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		14	0.071 (0.080)	48	348 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003-08RA	Wheat	2008	11		Sunstar 50-30		22	0.071 (0.080)	41	365 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL1 (1 Mo PBI)	Howard Hard Red	Hay	59	0.069 (0.078)	54	31 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		58	0.071 (0.080)	76	23 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003-08RA	Wheat	2008	11		Sunstar 50-30		82	0.071 (0.080)	53	30 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.03 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL001- 08RA	Wheat	2008	5	TWL6 (6 Mo PBI)	Pioneer 25R47	Hay	63	0.069 (0.078)	255	159 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002- 08RA	Wheat	2008	5		Traverse		50	0.071 (0.080)	76	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003- 08RA	Wheat	2008	11		Stephens		88	0.071 (0.080)	226	180 (6)	<0.01 <0.01 Avg. <0.01	0.01 0.01 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL001- 08RA	Wheat	2008	5	TWL12 (12 Mo PBI)	Briggs HRS	Hay	59	0.069 (0.078)	58	356 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002- 08RA	Wheat	2008	5		Traverse		61	0.071 (0.080)	76	348 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003- 08RA	Wheat	2008	11		Sunstar 50-30		87	0.071 (0.080)	68	365 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL1 (1 Mo PBI)	Howard Hard Red	Grain	84	0.069 (0.078)	80	31 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		83	0.071 (0.080)	112	23 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003-08RA	Wheat	2008	11		Sunstar 50-30		92	0.071 (0.080)	105	30 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL6 (6 Mo PBI)	Pioneer 25R47	Grain	88	0.069 (0.078)	311	159 (6)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		83	0.071 (0.080)	112	169 (6)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Ephrata, WA	EL003-08RA	Wheat	2008	11		Stephens		93	0.071 (0.080)	275	180 (6)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL12 (12 Mo PBI)	Briggs HRS	Grain	91	0.069 (0.078)	114	356 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		85	0.071 (0.080)	112	348 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Ephrata, WA	EL003-08RA	Wheat	2008	11		Sunstar 50-30		90	0.071 (0.080)	99	365 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL1 (1 Mo PBI)	Howard Hard Red	Straw	67	0.069 (0.078)	80	31 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		59	0.071 (0.080)	112	23 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003-08RA	Wheat	2008	11		Sunstar 50-30		90	0.071 (0.080)	105	30 (1)	<0.01 <0.01 Avg. <0.01	0.01 0.01 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL6 (6 Mo PBI)	Pioneer 25R47	Straw	84	0.069 (0.078)	311	159 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		64	0.071 (0.080)	112	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL003-08RA	Wheat	2008	11		Stephens		57	0.071 (0.080)	275	180 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL001-08RA	Wheat	2008	5	TWL12 (12 Mo PBI)	Briggs HRS	Straw	78	0.069 (0.078)	114	356 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Springfield, NE	EL002-08RA	Wheat	2008	5		Traverse		80	0.071 (0.080)	112	348 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Ephrata, WA	EL003-08RA	Wheat	2008	11		Sunstar 50-30		86	0.071 (0.080)	99	365 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL004- 08RA	Wheat	2008	5	TWH1 (1 Mo PBI)	Howard Hard Red	Forage	18	0.137 (0.154)	41	31 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005- 08RA	Wheat	2008	5		Traverse		14	0.143 (0.161)	48	23 (1)	<0.01 <0.01 Avg. <0.01	0.01 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006- 08RA	Wheat	2008	11		Sunstar 50-30		21	0.142 (0.160)	33	30 (1)	<0.01 <0.01 Avg. <0.01	0.04 0.01 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL004- 08RA	Wheat	2008	5	TWH6 (6 Mo PBI)	Pioneer 25R47	Forage	32	0.140 (0.157)	247	159 (6)	<0.01 <0.01 Avg. <0.01	0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005- 08RA	Wheat	2008	5		Traverse		14	0.140 (0.158)	48	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006- 08RA	Wheat	2008	11		Stephens		19	0.142 (0.160)	185	180 (6)	<0.01 <0.01 Avg. <0.01	0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL004- 08RA	Wheat	2008	5	TWH12 (12 Mo PBI)	Briggs HRS	Forage	18	0.138 (0.155)	50	356 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005- 08RA	Wheat	2008	5		Traverse		15	0.142 (0.160)	48	348 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006- 08RA	Wheat	2008	11		Sunstar 50-30		22	0.142 (0.160)	41	365 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL004- 08RA	Wheat	2008	5	TWH1 (1 Mo PBI)	Howard Hard Red	Hay	53	0.137 (0.154)	54	31 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005- 08RA	Wheat	2008	5		Traverse		50	0.143 (0.161)	76	23 (1)	<0.01 <0.01 Avg. <0.01	0.03 0.03 Avg. 0.03	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006- 08RA	Wheat	2008	11		Sunstar 50-30		80	0.142 (0.160)	53	30 (1)	<0.01 <0.01 Avg. <0.01	0.03 0.02 Avg. 0.03	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL004- 08RA	Wheat	2008	5	TWH6 (6 Mo PBI)	Pioneer 25R47	Hay	63	0.140 (0.157)	255	159 (6)	<0.01 <0.01 Avg. <0.01	0.01 0.02 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005- 08RA	Wheat	2008	5		Traverse		53	0.140 (0.158)	76	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006- 08RA	Wheat	2008	11		Stephens		85	0.142 (0.160)	226	180 (6)	<0.01 <0.01 Avg. <0.01	0.02 0.03 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL004- 08RA	Wheat	2008	5	TWH12 (12 Mo PBI)	Briggs HRS	Hay	56	0.138 (0.155)	58	356 (12)	<0.01 <0.01 Avg. <0.01	0.02 0.03 Avg. 0.03	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005- 08RA	Wheat	2008	5		Traverse		52	0.142 (0.160)	76	348 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006- 08RA	Wheat	2008	11		Sunstar 50-30		83	0.142 (0.160)	68	365 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL004-08RA	Wheat	2008	5	TWH1 (1 Mo PBI)	Howard Hard Red	Grain	83	0.137 (0.154)	80	31 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005-08RA	Wheat	2008	5		Traverse		84	0.143 (0.161)	112	23 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006-08RA	Wheat	2008	11		Sunstar 50-30		91	0.142 (0.160)	105	30 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL004-08RA	Wheat	2008	5	TWH6 (6 Mo PBI)	Pioneer 25R47	Grain	88	0.140 (0.157)	311	159 (6)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Springfield, NE	EL005-08RA	Wheat	2008	5		Traverse		82	0.140 (0.158)	112	169 (6)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Ephrata, WA	EL006-08RA	Wheat	2008	11		Stephens		93	0.142 (0.160)	275	180 (6)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL004-08RA	Wheat	2008	5	TWH12 (12 Mo PBI)	Briggs HRS	Grain	90	0.138 (0.155)	114	356 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Springfield, NE	EL005-08RA	Wheat	2008	5		Traverse		84	0.142 (0.160)	112	348 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Ephrata, WA	EL006-08RA	Wheat	2008	11		Sunstar 50-30		90	0.142 (0.160)	99	365 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Arkansaw, WI	EL004-08RA	Wheat	2008	5	TWH1 (1 Mo PBI)	Howard Hard Red	Straw	62	0.137 (0.154)	80	31 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005-08RA	Wheat	2008	5		Traverse		66	0.143 (0.161)	112	23 (1)	<0.01 <0.01 Avg. <0.01	0.01 <0.01 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006-08RA	Wheat	2008	11		Sunstar 50-30		83	0.142 (0.160)	105	30 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting (DAP) ^c	PBI Days (Months) ^d	Residue (ppm) ^e				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Arkansaw, WI	EL004-08RA	Wheat	2008	5	TWH6 (6 Mo PBI)	Pioneer 25R47	Straw	76	0.140 (0.157)	311	159 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Springfield, NE	EL005-08RA	Wheat	2008	5		Traverse		58	0.140 (0.158)	112	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Ephrata, WA	EL006-08RA	Wheat	2008	11		Stephens		71	0.142 (0.160)	275	180 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Arkansaw, WI	EL004-08RA	Wheat	2008	5	TWH12 (12 Mo PBI)	Briggs HRS	Straw	76	0.138 (0.155)	114	356 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Springfield, NE	EL005-08RA	Wheat	2008	5		Traverse		71	0.142 (0.160)	112	348 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Ephrata, WA	EL006-08RA	Wheat	2008	11		Sunstar 50-30		89	0.142 (0.160)	99	365 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g

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^a Either 1 month (plots TWL1 and TWH1), 6 months (plots TWL6 and TWH6), or 12 months (plots TWL12 and TWH12) after planting potato seed pieces treated with BYF 14182 FS240, the seedbed was prepared and a rotational crop of wheat was planted.

^b Potato seed pieces treated with BYF 14182 FS240 at a rate of 2 g ai/100 kg seed were planted at a target seeding rate of 4,000 seeds/ha in all treated plots, resulting in a target soil application rate of 80 g BYF 14182/ha. In those plots receiving the high application rate (TWH1, TWH6, and TWH12), an additional in-furrow application of BYF 14182 FS240 was made at planting at a target rate of 80 g BYF 14182/ha.

^c Days after planting (DAP) is the interval between planting of the wheat and harvest of the mature commodity.

^d PBI (plant-back interval) is the interval between application (planting of the treated potato seed pieces) and planting of the wheat.

^e BYF 14182 = penflufen), Pen-3HB = BYF 14182 3-hydroxy butyl; Pen-HGT = BYF 14182 homoglutathione, Pen-PCX = BYF 14182-pyrazole-4-carboxamide, and Pen-D3C = BYF 14182 bis-desmethyl-3-carboxylic acid.

^f Wheat grain from the 6-month and 12-month PBI plots (TWL6, TWL12, TWH6, and TWH12) were not analyzed because no analyte residues were observed at the 1-month PBIs.

^g Wheat straw from the 12-month PBI plots (TWL12 and TWH12) were not analyzed because no analyte residues were observed at the 6-month PBIs.

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Table 6.6.3-6 Residue data from mustard green rotational crop field trials conducted with BYF 14182 FS240

Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Suffolk, VA	EL079-08RA	Mustard Greens	2008	2	TML1 (1 Mo PBI)	Savannah	Fresh Greens	NA	0.071 (0.080)	29	28 (1)	<0.01 <0.01 Avg. <0.01	0.03 0.05 Avg. 0.04	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Gardner, KS	EL080-08RA	Mustard Greens	2008	5		Southern Giant		NA	0.071 (0.079)	56	29 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
East Bernard, TX	EL081-08RA	Mustard Greens	2008	6		Florida Broadleaf		NA	0.071 (0.080)	41	30 (1)	<0.01 <0.01 Avg. <0.01	0.03 0.03 Avg. 0.03	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Suffolk, VA	EL079-08RA	Mustard Greens	2008	2	TML6 (6 Mo PBI)	Savannah	Fresh Greens	NA	0.071 (0.080)	59	178 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Gardner, KS	EL080-08RA	Mustard Greens	2008	5		Southern Giant		NA	0.071 (0.079)	64	175 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
East Bernard, TX	EL081-08RA	Mustard Greens	2008	6		Florida Broadleaf		NA	0.071 (0.080)	57	189 (6)	<0.01 <0.01 Avg. <0.01	0.03 0.03 Avg. 0.03	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Suffolk, VA	EL079-08RA	Mustard Greens	2008	2	TML12 (12 Mo PBI)	Savannah	Fresh Greens	NA	0.071 (0.080)	58	367 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Gardner, KS	EL080-08RA	Mustard Greens	2008	5		Southern Giant		NA	0.071 (0.079)	64	358 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
East Bernard, TX	EL081-08RA	Mustard Greens	2008	6		Florida Broadleaf		NA	0.071 (0.080)	46	358 (12)	<0.01 <0.01 Avg. <0.01	0.01 0.01 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	0.02 0.03 Avg. 0.03
Suffolk, VA	EL085-08RA	Mustard Greens	2008	2	TMH1 (1 Mo PBI)	Savannah	Fresh Greens	NA	0.144 (0.162)	26	29 (1)	<0.01 <0.01 Avg. <0.01	0.18 0.15 Avg. 0.17	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	0.02 0.02 Avg. 0.02
Gardner, KS	EL086-08RA	Mustard Greens	2008	5		Southern Giant		NA	0.142 (0.159)	56	28 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
East Bernard, TX	EL087-08RA	Mustard Greens	2008	6		Florida Broadleaf		NA	0.143 (0.160)	42	28 (1)	<0.01 <0.01 Avg. <0.01	0.03 0.03 Avg. 0.03	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Suffolk, VA	EL085-08RA	Mustard Greens	2008	2	TMH6 (6 Mo PBI)	Savannah	Fresh Greens	NA	0.144 (0.162)	59	176 (6)	<0.01 <0.01 Avg. <0.01	<0.01 0.01 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Gardner, KS	EL086-08RA	Mustard Greens	2008	5		Southern Giant		NA	0.143 (0.161)	64	174 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	0.02 <0.01 Avg. <0.01
East Bernard, TX	EL087-08RA	Mustard Greens	2008	6		Florida Broadleaf		NA	0.142 (0.159)	57	187 (6)	<0.01 <0.01 Avg. <0.01	0.02 0.03 Avg. 0.03	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	0.01 0.03 Avg. 0.02
Suffolk, VA	EL085-08RA	Mustard Greens	2008	2	TMH12 (12 Mo PBI)	Savannah	Fresh Greens	NA	0.144 (0.162)	58	365 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Gardner, KS	EL086-08RA	Mustard Greens	2008	5		Southern Giant		NA	0.141 (0.158)	64	358 (12)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
East Bernard, TX	EL087-08RA	Mustard Greens	2008	6		Florida Broadleaf		NA	0.142 (0.160)	46	356 (12)	<0.01 <0.01 Avg. <0.01	0.01 0.02 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	0.03 0.04 Avg. 0.03

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- ^a Either 1 month (plots TML1 and TMH1), 6 months (plots TML6 and TMH6), or 12 months (plots TML12 and TMH12) after planting potato seed pieces treated with BYF 14182 FS240, the seedbed was prepared and a rotational crop of mustard greens was planted.
- ^b Potato seed pieces treated with BYF 14182 FS240 at a rate of 2 g ai/100 kg seed were planted at a target seeding rate of 4,000 seeds/ha in all treated plots, resulting in a target soil application rate of 80 g BYF 14182/ha. In those plots receiving the high application rate (TMH1, TMH6, and TMH12), an additional in-furrow application of BYF 14182 FS240 was made at planting at a target rate of 80 g BYF 14182/ha.
- ^c Days after planting (DAP) is the interval between planting of the mustard greens and harvest of the mature commodity.
- ^d PBI (plant-back interval) is the interval between application (planting of the treated potato seed pieces) and planting of the mustard greens.
- ^e BYF 14182 = penflufen), Pen-3HB = BYF 14182 3-hydroxy butyl; Pen-HGT = BYF 14182 homoglutathione, Pen-PCX = BYF 14182-pyrazole-4-carboxamide, and Pen-D3C = BYF 14182 bis-desmethyl-3-carboxylic acid.

Table 6.6.3-7 Residue data from turnip rotational crop field trials conducted with BYF 14182 FS240.

Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Athens, GA	EL076-08RA	Turnip	2008	2	TTL1 (1 Mo PBI)	Purple Top	Tops	16	0.071 (0.080)	92	30 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Gardner, KS	EL077-08RA	Turnip	2008	5		Shogoin		13	0.071 (0.079)	66	29 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Uvalde, TX	EL078-08RA	Turnip	2008	6		Purple Top White Globe		11	0.073 (0.081)	57	28 (1)	<0.01 <0.01 Avg. <0.01	0.02 0.03 Avg. 0.02	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Athens, GA	EL076-08RA	Turnip	2008	2	TTL6 (6 Mo PBI)	Purple Top	Tops	12	0.071 (0.080)	106	181 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS	EL077-08RA	Turnip	2008	5		Shogoin		9	0.071 (0.079)	252	175 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Uvalde, TX	EL078-08RA	Turnip	2008	6		Purple Top White Globe		8	0.073 (0.081)	55	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Athens, GA	EL076-08RA	Turnip	2008	2	TTL12 (12 Mo PBI)	Purple Top	Tops	9	0.071 (0.080)	87	365 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Gardner, KS	EL077-08RA	Turnip	2008	5		Shogoin		10	0.071 (0.079)	56	358 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Uvalde, TX	EL078-08RA	Turnip	2008	6		Purple Top White Globe		10	0.073 (0.081)	59	365 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Athens, GA	EL076-08RA	Turnip	2008	2	TTL1 (1 Mo PBI)	Purple Top	Roots	10	0.071 (0.080)	92	30 (1)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS	EL077-08RA	Turnip	2008	5		Shogoin		12	0.071 (0.079)	66	29 (1)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Uvalde, TX	EL078-08RA	Turnip	2008	6		Purple Top White Globe		10	0.073 (0.081)	57	28 (1)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Athens, GA	EL076-08RA	Turnip	2008	2	TTL6 (6 Mo PBI)	Purple Top	Roots	11	0.071 (0.080)	106	181 (6)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Gardner, KS	EL077-08RA	Turnip	2008	5		Shogoin		10	0.071 (0.079)	252	175 (6)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Uvalde, TX	EL078-08RA	Turnip	2008	6		Purple Top White Globe		9	0.073 (0.081)	55	169 (6)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Athens, GA	EL076-08RA	Turnip	2008	2	TTL12 (12 Mo PBI)	Purple Top	Roots	9	0.071 (0.080)	87	365 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS	EL077-08RA	Turnip	2008	5		Shogoin		11	0.071 (0.079)	56	358 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Uvalde, TX	EL078-08RA	Turnip	2008	6		Purple Top White Globe		9	0.073 (0.081)	59	365 (12)	NA ^g	NA ^g	NA ^g	NA ^g	NA ^g
Athens, GA	EL082-08RA	Turnip	2008	2	TTH1 (1 Mo PBI)	Purple Top	Tops	17	0.143 (0.161)	92	30 (1)	<0.01 <0.01 Avg. <0.01	0.01 <0.01 Avg. 0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Gardner, KS	EL083-08RA	Turnip	2008	5		Shogoin		14	0.142 (0.159)	72	28 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Uvalde, TX	EL084-08RA	Turnip	2008	6		Purple Top White Globe		12	0.143 (0.160)	57	28 (1)	<0.01 <0.01 Avg. <0.01	0.04 0.04 Avg. 0.04	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Athens, GA	EL082-08RA	Turnip	2008	2	TTH6 (6 Mo PBI)	Purple Top	Tops	11	0.143 (0.160)	106	181 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS	EL083-08RA	Turnip	2008	5		Shogoin		10	0.143 (0.161)	64	174 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Uvalde, TX	EL084-08RA	Turnip	2008	6		Purple Top White Globe		9	0.143 (0.160)	55	169 (6)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Athens, GA	EL082-08RA	Turnip	2008	2	TTH12 (12 Mo PBI)	Purple Top	Tops	12	0.142 (0.159)	87	365 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Gardner, KS	EL083-08RA	Turnip	2008	5		Shogoin		10	0.142 (0.159)	64	358 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Uvalde, TX	EL084-08RA	Turnip	2008	6		Purple Top White Globe		10	0.143 (0.160)	59	365 (12)	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f
Athens, GA	EL082-08RA	Turnip	2008	2	TTH1 (1 Mo PBI)	Purple Top	Roots	10	0.143 (0.161)	92	30 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS	EL083-08RA	Turnip	2008	5		Shogoin		13	0.142 (0.159)	72	28 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Uvalde, TX	EL084-08RA	Turnip	2008	6		Purple Top White Globe		10	0.143 (0.160)	57	28 (1)	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01	<0.01 <0.01 Avg. <0.01
Athens, GA	EL082-08RA	Turnip	2008	2	TTH6 (6 Mo PBI)	Purple Top	Roots	10	0.143 (0.160)	106	181 (6)	NA ^h	NA ^h	NA ^h	NA ^h	NA ^h
Gardner, KS	EL083-08RA	Turnip	2008	5		Shogoin		16	0.143 (0.161)	64	174 (6)	NA ^h	NA ^h	NA ^h	NA ^h	NA ^h
Uvalde, TX	EL084-08RA	Turnip	2008	6		Purple Top White Globe		9	0.143 (0.160)	55	169 (6)	NA ^h	NA ^h	NA ^h	NA ^h	NA ^h
Athens, GA	EL082-08RA	Turnip	2008	2	TTH12 (12 Mo PBI)	Purple Top	Roots	8	0.142 (0.159)	87	365 (12)	NA ^h	NA ^h	NA ^h	NA ^h	NA ^h

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Location (City, State)	Trial Number	Crop ^a	Year	Region	Plot Name	Crop Variety	Commodity	% Dry Matter	Total Rate ^b Lb ai/A (kg ai/ha)	Days After Planting	PBI Days (Months) ^c	Residue (ppm)				
												BYF 14182	Pen-3HB	Pen-HGT	Pen-PCX	Pen-D3C
Gardner, KS	EL083-08RA	Turnip	2008	5		Shogoin		12	0.142 (0.159)	64	358 (12)	NA ^h	NA ^h	NA ^h	NA ^h	NA ^h
Uvalde, TX	EL084-08RA	Turnip	2008	6		Purple Top White Globe		9	0.143 (0.160)	59	365 (12)	NA ^h	NA ^h	NA ^h	NA ^h	NA ^h

^a Either 1 month (plots TTL1 and TTH1), 6 months (plots TTL6 and TTH6), or 12 months (plots TTL12 and TTH12) after planting potato seed pieces treated with BYF 14182 FS240, the seedbed was prepared and a rotational crop of turnips was planted.

^b Potato seed pieces treated with BYF 14182 FS240 at a rate of 2 g ai/100 kg seed were planted at a target seeding rate of 4,000 seeds/ha in all treated plots, resulting in a target soil application rate of 80 g BYF 14182/ha. In those plots receiving the high application rate (TTH1, TTH6, and TTH12), an additional in-furrow application of BYF 14182 FS240 was made at planting at a target rate of 80 g BYF 14182/ha.

^c Days after planting (DAP) is the interval between planting of the turnips and harvest of the mature commodity.

^d PBI (plant-back interval) is the interval between application (planting of the treated potato seed pieces) and planting of the turnips.

^e BYF 14182 = penflufen, Pen-3HB = BYF 14182 3-hydroxy butyl; Pen-HGT = BYF 14182 homoglutathione, Pen-PCX = BYF 14182-pyrazole-4-carboxamide, and Pen-D3C = BYF 14182 bis-desmethyl-3-carboxylic acid.

^f Turnip tops from the 12-month PBI plots (TTL12 and TTH12) were not analyzed because no analyte residues were observed at the 6-month PBIs.

^g Turnip roots from the low-rate plots (TTL1, TTL6, and TTL12) were not analyzed because no analyte residues were observed in turnip roots from the high-rate plots.

^h Turnip roots from the high-rate 6-month and 12-month PBI plots (TTH6 and TTH12) were not analyzed because no analyte residues were observed at the 1-month PBI.

Conclusion:

Potato seed pieces were planted according to one of two regimes, either seed treatment only (low rate, rates ranged from 78 to 81 g BYF 14182/ha or 0.069 to 0.073 lb BYF 14182/A) or seed treatment accompanied by an in-furrow application at the time of planting (high rate, rates ranged from 154 to 162 g BYF 14182/ha or 0.137 to 0.144 lb BYF 14182/A). Rotational crops representative of a cereal (wheat), root crop (turnips), and leafy vegetable (mustard greens) were planted in the plots at plant-back intervals of 1, 6, and 12 months.

In wheat, no residues of penflufen or its metabolites greater than the LOQ (0.01 ppm) were observed in wheat grain at any PBI at either rate (80 g ai/ha or 160 ai/ha). In plots treated at rates ranging from 78 to 80 g BYF 14182/ha, residues of Pen-3HB were observed in forage at the 1-month (0.02 ppm) and 6-month PBI (0.01 ppm), in hay at the 1-month (0.03 ppm) and 6-month PBI (0.01 ppm), and in straw at the 1-month PBI (0.01 ppm). In plots treated at rates ranging from 154 to 161 g BYF 14182/ha, maximum residues of Pen-3HB were observed at the 1-month (0.04 ppm) and 6-month PBI (0.01 ppm), in hay at all PBIs (1-month, 0.03 ppm; 6-month, 0.03 ppm; and 12-month, 0.03 ppm), and in straw at the 1-month PBI (0.02 ppm). No residues of BYF 14182, Pen-HGT, or Pen-PCX were observed in any wheat matrix at any PBI from either treatment pattern.

In turnips, no residues of penflufen or its metabolites greater than the LOQ (0.01 ppm) were observed in the roots at any PBI. In turnips treated at rates ranging from 159 to 161 g BYF 14182/ha, a maximum Pen-3HB residue of 0.04 ppm occurred in tops at the 1-month PBI and no residues were observed in the subsequent PBI. In turnips treated at rates ranging from 79 to 81 g BYF 14182/ha, a Pen-3HB residue of 0.03 ppm occurred in tops at the 1-month PBI; samples from roots were not analyzed based on the results of the high-rate application pattern.. No residues of BYF 14182, Pen-HGT, or Pen-PCX were observed in turnip tops or roots at any PBI from either treatment pattern.

In mustard greens, residues of Pen-3HB were observed at all PBIs from both treatment patterns. A maximum Pen-3HB residue of 0.18 ppm, likely an outlier, was observed at the 1-month PBI in mustard greens treated at rates ranging from 158 to 162 g BYF 14182/ha. Maximum Pen-3HB residues were much lower in samples from the later 6-month and 12-month PBIs (0.03 ppm and 0.02 ppm, respectively). Additionally, residues of Pen-D3C were observed at the 1-month (0.02 ppm), 6-month (0.03 ppm), and 12-month PBIs (0.04 ppm). In mustard greens treated at rates ranging from 79 to 80 g BYF 14182/ha, residues of Pen-3HB were 0.05 ppm at the 1-month PBI, 0.03 ppm at the 6-month PBI, and 0.01 ppm at the 12-month PBI. Pen-D3C residue was found only at the 12-month PBI (0.03 ppm). No residues of BYF 14182, Pen-HGT, or Pen-PCX were observed in mustard greens at any PBI from either treatment pattern.

Scientific Acceptability

Adequate documentation of the field and analytical portions of these crop field trials has been provided. The data were generated using an adequately validated analytical method. Limited storage stability data are available that demonstrate that residues of penflufen and its metabolites are stable in a variety of matrices for up to 9 months and may be stable for longer periods of time. A storage stability study is underway which is designed to provide storage stability data on a wide range of matrices for up to 24 months. Provided the

additional storage stability data demonstrates that penflufen and its metabolites, are stable for the full scheduled duration of the study, this field trial study is considered scientifically acceptable.